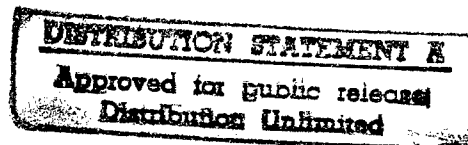


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14 FEBRUARY 1989



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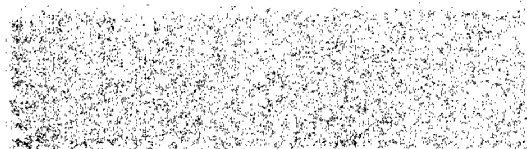
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KENYA

Growth of Telecommunications Traced
55000009 Nairobi DAILY NATION in English
5 Dec 89 pp 13, 19

[Excerpts] The Gilgil Multipurpose Manufacturing Complex is one of the monumental achievements of the KPTC [Kenya Post and Telecommunications Corporation] in the last 25 years of Kenya's Independence.

The rapid growth of both Postal and Telecommunication services recorded from 1963 to date, has enabled the corporation to widen its scope and enter the manufacturing stage in order to further develop and enhance its services. [Passage omitted]

Telecommunication:

KPTC's telecommunication sub-sector is probably the fastest growing component of the communication sector in Kenya today.

This has enabled the country to keep fairly abreast with the fast global changes in technology and equipment, as well as placing the country next door to the international business centres and markets.

Kenya has therefore amply benefitted from the hub of international business that has found a conducive and well equipped communication base in Nairobi.

The corporation in its present format is only over a decade old, the domestic telecommunications network has achieved an impressive growth.

The three main telecommunication services provided by the corporation are telephone, telex and telegraph. These services account for the bulk of the corporation's domestic telecommunication undertaking as well as revenue. Other services are radio call, data services and ship to shore service.

At independence the local telephone network had only 48 automatic and 108 manual telephone exchanges. This at the beginning of the Nyayo Era in 1978 had risen to 56 automatic and 194 manual exchanges, representing a 60 percent increase. Subscribers exchange lines also registered an increase from 24,918 to 65,344.

Telex service registered an equally impressive growth rate from only one telex exchange in Nairobi to three automatic telex exchanges with 2,546 connection.

Inland telegraph service has doubled from 300,000 messages to 658,180 during the same period.

To satisfy the ever growing demand for telecommunication services, the corporation has strived to be among the best serviced countries in Africa.

To achieve this status the corporation has since its formation in 1977 embarked on a series of development programmes geared at the systematic expansion, modernisation and diversification of the services.

In the first development programme, 1979-1983, the corporation planned to extend local services, introduce high quality long distance circuits, international subscriber dialling, along with the diversified provision of basic telecommunication facilities in the rural areas, that were previously poorly served.

The programme provided:

- A total of about 36,000 additional lines of switching equipment
- Additional 3,000 multiplex channels for long distance trunks
- Additional 52,600 exchange connections throughout the country.

To achieve these no doubt ambitious undertakings, the corporation secured loans from the World Bank and the Overseas Economic Corporation Fund of Japan to finance the cost of this programme, in addition to its own resources and other bilateral arrangements.

But with the growth in demand of quality service, given the rapid changes and improvement in telecommunication service worldwide, the corporation's second development programme, 1984-1987 was dimensioned for a subscriber growth rate of 16 percent a year.

To achieve this, while guaranteeing better quality and efficient services have demanded that KPTC keep abreast with the technological advances in telecommunication switching systems.

In 1987, the corporation signed a major contract with an Italian company for the installation of the National Digital switching network projects for the digitalisation of the national network.

On completion of this project an additional 40,000 subscriber lines will be realised and ready for allocation.

The growth has also catered for the growth of public call offices which have risen from 655 in 1982 to over 3,500.

The growth of domestic telephone network has risen from 230 telephone exchanges in 1977 to over 380. It is expected that by 1990, the total number of telephone exchanges will have grown to about 690. To date telephone exchange capacities and exchange connections have also experienced a steady increase.

Telephone traffic, manually handled telephone calls rose from 13.3 million in 1977 to 18.7 million in 1982. Due to automation of many exchanges, the number of manually handled telephone calls dropped by over 2.3 million in 1983.

The total subscriber dialled unit during the same period rose from 292.7 million in 1977 to 943.1 million in 1986 representing an average annual growth rate of 14.4 percent.

International Subscriber Dialling Service

The biggest achievement during the Nyayo era and indeed the years of Kenya's independence was the introduction of automatic dialling of international telephone calls popularly known as the International Subscriber Dialling (ISD) in November, 1984. Until then subscribers wanting international calls had to book the calls with the international operators.

With the introduction of the international digital stored programme controlled exchange and provision of Automatic Number Identification (ANI) facilities at the end exchange in 1984, most of the subscribers were offered ISD service. As a result subscribers now have automatic access to telephone numbers in many foreign destinations.

To exploit the facilities of the stored programme controlled exchange to the full, international operator service has also been modernised. The operators at the international exchange now use a switchboard with a visual display unit where the calling numbers are displayed automatically on the screen. The time wasting preparation of tickets is thus eliminated. Once a call is connected all the details are automatically transferred to the computer for billing purposes and the operator is free to receive and deal with another call from the queue.

The international subscriber dialling service is available to most subscribers being served by automatic local exchanges and there are plans to extend the service to all the subscribers in the country.

Television Centre

To meet the entertainment and information demands of the Kenyan public television reception and transmission facilities were introduced at the Longonot earth station in 1978. The centre has the capacity of converting television programmes into any of the three TV standards used internationally, i.e., PAL, SECAM and NTSC. One live programme can be converted at a time. There is an additional circuit for recording a programme for later transmission. Kenyan public are familiar with past the live coverage of international football and other sporting events in colour. [as published]

Second Antenna at Longonot

Kenya has over the years established herself as a popular venue for international meetings while her holiday resorts have attracted many tourists to the country. The result of this coupled with the increasing needs of the business community, has been increased demand for communication with different countries.

The earth station, introduced in 1970, could not cope as it was working to the Indian Ocean satellite and hence could only cover a limited region of the earth. A second earth station working to the Atlantic Ocean satellite was, therefore, installed in 1981 to increase the region of coverage. Currently both of them handle about 600 channels.

The use of satellite system has also enabled us to provide direct telecommunication services to other countries in our region like Somalia, Burundi, Rwanda and others.

Telex Service

While the telephone enjoyed tremendous growth in both volume and facilities other services did not stay behind. The telex exchange in Nairobi was modernised to cope with increased demand for telex service. Most big companies have been able to get enough lines and machines installed in their premises.

The small companies which do not find it viable to rent machines on a full-time basis were however given a cheaper alternative—the Telex Bureau Service.

This service involves the sharing of facilities between a number of subscribers at minimal monthly fee. The subscribers are allowed to use the telex number on their letter heads. The messages for transmission are handed in at special counters and incoming messages are delivered at the subscribers' prescribed premises by post office delivery messengers. This service has proved to be popular with small firms especially those involved in international trade like import-export.

Bureaufax Service

While photocopying of documents has become popular locally distant photocopying likewise has come into the limelight. Distant photocopying or facsimile, involves the use of special machines to transmit images of documents through ordinary telephone lines. Individuals can use their own machines or use the post office bureau machine. There has grown the need to transmit contract documents, diagrams, letters written in alphabets like Gujarat or Arabic and similar documents. To meet this demand bureaux were set up in 1984 in Nairobi and Mombasa.

Miscellaneous Services

Considerable improvements have also been carried out on such services as voicecast phototelegrams, leased circuits and ships-to-shore communication. Also newly introduced during last 10 years are video-conferencing, and international telephone call booths.

MALI

PRC-Built Radio Link for Diplomats Detailed *55000008 Bamako L'ESSOR in French 22-23 Oct p 6*

[Article by Malick Kante: "Three Stations Link Us to our Diplomatic Representatives"]

[Text] On Monday morning, the Malian Diplomatic Communications Center, built jointly by our country and China, was officially delivered to the Malian Government by Mr Lu Xuejian, Chinese vice-minister of foreign economic and trade relations. Construction of the project, initiated in 1981 to facilitate communications between our diplomatic representatives abroad and the Department of Foreign Affairs, started on 25 November 1985. The three stations of this modern communication center are now operational.

The station located at Souleymanebougou, near the Central Veterinary Laboratory, is a receiving center for this diplomatic radio link. It will receive telex and Morse-code signals from 18 Malian diplomatic missions all over the world.

This receiving center is equipped with very efficient equipment. Its instruments can receive electric signals (used to transmit messages) of 1.5 microvolts. It has 13 pairs of antennas oriented in various directions, 6 receiving sets, and other technical equipment to transmit the messages received to the Ministry of Foreign Affairs in Koulouba.

The transmitting station of the diplomatic radio link is located in Kati. It has three modern transmitters to communicate with distant countries, and two mid-range transmitters (for African countries). Finally, the third facility of the center is the telegraph building built at the Ministry of Foreign Affairs in Koulouba. There, five teleprinters will receive information from Souleymanebougou and transmit it to the Kati station. Note that the three facilities are linked by underground control cables.

After visiting the premises in the company of the Chinese ambassador to Mali, our minister of foreign affairs, Mr Modibo Keita, expressed the feelings of deep gratitude of the Malian people, its party, and its government toward the People's Republic of China. He stressed the fruitful and friendly character of the two countries' cooperation and the determination of their leaders to continue and diversify cooperation for development. Mr Keita had previously paid tribute to the exemplary character of bilateral economic relations between Mali and China.

In his answer, Mr Lu Xuejian transmitted warm salutations from the Chinese Government and people to Mali. The Chinese vice-minister of foreign economic and trade relations also stated that the (Chinese and Malian)

workers and technicians who built this Radio Center had conjugated their efforts and worked together in a friendly way to "write a new chapter in the annals of Chinese-Malian friendship."

He also added: "President Moussa Traore and Malian leaders have given considerable attention and active support to this Diplomatic Communications Center which will make it possible to improve Mali's diplomatic communications and will also contribute to the development of bonds of friendship between this country and other countries throughout the world."

Prior to this pleasant exchange, Mr Sekou Minandjou Traore, secretary in charge of foreign relations at the BEC [Central Executive Office] had cut the symbolic ribbon at the Kati transmitting station. Several personalities from the Malian Government and from the Chinese Embassy to Mali attended the ceremony.

NIGER

TV, Radio Broadcast Agreement Signed With USSR

*55000007 Niamey LE SAHEL in French
12 Dec 88 p 5*

[Article: "Exchange Agreement Signed by ORTN and Gosteleradio of the USSR"]

[Text] A radio and television exchange agreement was signed on 9 December 1988 by Mr Abdou Souley, general manager of the Niger Radio and Television Broadcasting Office [ORTN], and His Excellency Mr Vitaliy Litvin, ambassador extraordinary and plenipotentiary of the Union of Soviet Socialist Republics (USSR).

This protocol provides for expanded cooperation between the Soviet State Committee for Television and Radio Broadcasting (Gosteleradio of the USSR) and the ORTN, particularly through the exchange of documentary television films on various subjects, including: popular science, sports, music, drama, entertainment programs for children and adolescents, and folk arts, as well as any other programs that deal with the sociocultural affairs of the Soviet and Niger peoples.

The accord also calls for Gosteleradio of the USSR and ORTN to organize study tours for journalists, and to promote joint production of radio and television programs.

Gosteleradio of the USSR has pledged to provide ORTN with as much technical assistance as possible.

At the conclusion of the signing ceremony the two sides expressed great satisfaction with the excellent state of the friendly and cooperative relations which exist between the two countries.

Japanese Group Joins in Creating Telesat Mobile Firm

55200016 Toronto *THE GLOBE AND MAIL*
in English 13 Dec 88 p B8

[Article by Jane Becker]

[Text] Ottawa—Canadian Pacific Ltd. of Montreal and a Japanese consortium headed by C. Itoh & Co. Ltd. of Japan, the world's largest trading company, have become shareholders with Telesat Canada in a new Canadian-based telecommunications company set up to provide mobile satellite communication services in North America.

Telesat, which will hold 50 per cent to the new company, Telesat Mobile Inc., made the announcement yesterday.

CP Ltd., which already holds a small interest in Telesat, will own 30 per cent of TMI and the Japanese Group the remaining 20 per cent.

Each will contribute capital, totalling \$100-million, in proportion to its shareholding. The rest of the \$360-million project will be financed through bank debt, debentures and export credits by the shareholders.

The Ontario High Technology Fund is expected to provide capital for the first equipment contracts for the mobile satellite, which will orbit the earth 36,800 kilometres high.

More powerful, and operating on a different frequency band than Telesat's Anik satellites, the new MSAT is designed to provide continuous two-way communications for moving vehicles and remote stations anywhere in North America.

It is expected to be launched in 1993, and will be among the first such satellites in North America.

Telesat, an Ottawa-based satellite communications company owned jointly by the federal government and Canadian telecommunications carriers, will supply engineering services and oversee day-to-day operation of the satellite.

The service is expected to have about 160,000 users for voice and data communications by the turn of the century. The federal government has already contracted for \$126-million in services.

Until MSAT is launched, TMI will lease space from an international marine satellite, INMARSAT, to provide interim satellite communications for MSAT customers.

TMI recently signed an agreement with the American Mobile Satellite Consortium to procure and provide satellite services in the United States on MSAT until AMSC launches its own satellite, probably in 1994. At that time, each satellite will act as a back-up for the other.

Imperial Bank of Commerce To Launch Satellite Pilot Project

55200014 Toronto *THE TORONTO STAR* in English
21 Nov 88 p B7

[Text] Bank branches in remote places will be brought closer to centres of operations if the Canadian Imperial Bank of Commerce succeeds in a pilot project using satellite communication.

The bank has a number of bank branches in areas where communication is poor, yet expensive.

To reach out to these branches and offer more services to their customers, the bank says it has decided to try out the VSAT (very small aperture terminals) technology offered by Telesat Canada.

Telesat provides a system designed for branches in places such as Hay River, Inuvik and Yellowknife that cannot be linked economically by land lines using standard communication means.

"Satellite technology is the cost-effective solution we have been seeking to allow us to offer the latest services and products to customers in remote areas," Rodney Chard, the bank's executive vice-president for systems, says in announcing the pilot project.

The project will eventually link 18 remote branches by satellite with bank data centres across Canada, the Commerce says, adding it's the first Canadian bank to use the VSAT technology.

The VSAT, introduced in 1986, uses compact, low-cost antennas that can be installed almost anywhere.

Optical Fiber System Develops Rapidly
HK2701153589 Beijing CEI Database in English
27 Jan 89

[Text] China has opened or planned to open 112 optical fiber cable lines with a total length of 4,342 kilometers.

So far, 36 cities have adopted optical fiber tele-communication technology in telephone networks and eight provinces have constructed optical fiber cable lines for long-distance communication service.

Besides meeting the domestic needs for optical fiber raw materials, there is surplus for foreign market.

China is now able to manufacture 14,000-16,000 kilometers of optical fiber cables each year and over 50 kinds of electro-optical elements.

They can be used for tele-communications, broadcast, television, railway, military, computer, transport and other purposes.

CAMBODIA

Ground Satellite Station Commissioned *BK2312055688 Phnom Penh SPK in English* 0500 GMT 23 Dec 88

[Text] Phnom Penh SPK December 22—The ground-satellite station named "Bayon" in Phnom Penh built with Soviet assistance and put into commission recently is the first of its kind ever built in Kampuchea.

In furtherance of a cooperation agreement signed between the two Governments of Kampuchea and the Soviet Union on July 15, 1982, the construction of the station started in February 1986 after a survey conducted by four Soviet experts and Kampuchean technicians with the final decision to made the ground of an ancient French cathedral destroyed by Pol Pot the site for the station.

On an area of 1.53 ha the station comprises five main buildings: technical headquarters, a power plant, an electric power cell, a warehouse, a directorate. A large parabolic antenna is installed at the middle of the station's lawn.

The total expense for the construction was roughly 45 million riels (Kampuchean currency), 18 million of which was raised by the Kampuchean side. The Soviet side supplied Kampuchea with an antenna system and other technical equipment, 200 tons of cement and other materials. Eighteen Soviet engineers have been sent to help Kampuchea construct this satellite station.

Since early 1987, the station staffed by 26 employees including three engineers graduated from the Soviet Union and with the assistance of four Soviet experts has made telephone and telex transmissions through Intersputnik network between Phnom Penh and Hanoi, Moscow and some other places in the world.

Besides, thanks to the station, Kampuchean television (T.V.K.) is able to receive T.V. programs broadcast directly another Soviet television in addition to its own programs. Relay station at the Soviet Embassy in Phnom Penh end. [paragraph as received]

LAOS

First Major Australian Telecom Contract Signed *BK2201151989 Vientiane KPL in English* 0906 GMT 21 Jan 89

[Text] Telecom's successful international arm, Telecom Australia (International) Ltd—TA (I), has won Australia's first significant commercial contract with the Government of the Lao People's Democratic Republic.

The contract, worth almost \$2 million, involves the establishment of telecommunication services between Lao PDR capital, Vientiane, and four of the country's

major cities, Luang Prabang, Thakhek, Savannakhet and Pakse. Radio communications equipment will be supplied and installed to provide telephone and data services over a total route length in excess of 1,000 km.

This will be the first major telecommunications upgrade in a country where telephone services are very poor.

The work by TA (I) will be undertaken on a turnkey basis using a range of equipment manufactured in Australia. The project will be funded by the World Bank.

A team of telecom engineers will be engaged on the project over a six month period.

The contract represents a milestone for Australian industry since up to this point there has been virtually no officially recorded trade between the Lao PDR and Australia. Australia's total exports to the Lao PDR in 1987 were \$69,000.

In announcing the contract January 21, TA (I)'s managing director, Mr Ken Loughnan said with technology and skills developed in Australia, TA (I) has worked to develop export opportunities for Australian industry beyond traditional markets and this work in the Lao PDR is expected to be the start of a much greater activity by TA (I) in the region.

MALAYSIA

New Era for Technology: Satellite Communication *42130034B Kuala Lumpur BERITA HARIAN in Malay* 13 Nov 88 p 4

[Text] The opening of the Kuantan 2A earth satellite station signals important progress toward achieving the Malaysian Telekom Company's [STM] goal of providing advanced and sophisticated telecommunication service to the Malaysian people.

According to Tan Sri Datuk Dr Mohd. Rashdan Baba, STM's executive president, such service is being given priority in the first year of the company's operation as a commercial organization.

Since responsibility for this country's telecommunication service was transferred to the STM in 1987, the company has taken determined steps toward strengthening its structure and organizational system and coordinating its operations to improve telecommunications quality and service.

Tan Sri Rashdan said the measures that have been taken have produced results. Facilities and services offered to customers have been improved and have increased.

"It was not an easy task. It required that we work hard, seek more pragmatic approaches, and cultivate greater resolve toward meeting our objectives in our staff," he added.

A radical reevaluation of its operations this past year led to a reorganization of the company's six regional divisions into self-sustaining commercial units.

STM's management also took stiff measures to reduce operating costs and to introduce more innovative marketing strategies.

"We prepared the bases and infrastructure needed to let us increase efficiency and the production capabilities of our organization. But the task before us is still formidable," he added.

In the next few years, which are so important, the STM will add local and international facilities so that Malaysians can continue to enjoy high quality communication services.

"STM is determined to further strengthen and expand its international links because of the rapidly increasing demand for high quality communications including that for overseas connections," said Tan Sri Rashdan.

The installation of undersea cables and satellite communication facilities allows Malaysia to have continuous and expeditious connections with almost all of the countries of the world.

Data communication systems such as Datel and the [Malaysian Peket Suis Awam Data Rangkaian] Malaysian Public Automatic Communications Data Link (MAYPAC) have developed rapidly.

"STM has expended a great deal of money. Now the company must get a return on its investment.

"We must make certain that there is maximum use of all of the facilities and services we have provided.

"For this purpose, we shall engage in more aggressive and innovative marketing in the next few months and in future years to offer our services and facilities to more customers," Tan Sri Rashdan added.

STM plans to participate in the development and advancement of the information industry by investing in technology—new commercial and regulatory systems that have a potential for increasing service and stimulating the company's growth.

Qualified management and manpower resources are the most important factors in determining how well the company succeeds in achieving these goals.

Therefore, this company will continue to focus its attention on efforts to create a staff that is qualified and one that feels good service and achievement are part of their life style.

"We care a great deal about the STM image. We have seriously tried to ensure that this company meets all high standards set for quality service and for satisfying the customers' desires."

There is definite evidence that these efforts have begun to produce positive results. Efficiency and production capability have improved. A sense of loyalty and direction toward goals is beginning to be evident.

"All of our customers—whether private telephone customers, commercial organizations, or government bodies—should benefit from our endeavors.

"They will be offered service that provides information and pleasure to them, makes their lives easier, and helps to make their commercial endeavors more efficient and meaningful," Tan Sri Rashdan said.

THAILAND

Communications Ministry Sets Rules for Satellite Bids

55004301a Bangkok SIAM RAT in Thai 22 Oct 88 p 2

[Text] In his capacity as the chairman of the Committee To Consider Proposals Concerning the Domestic Satellite Communications Project, Mr Siphum Sukhanet, the under secretary of communications, said that the committee has issued a resolution to have four private companies submit bids to implement the project. The four are: 1. the Cable and Wire Race Company in conjunction with the (Piyanan) Group; 2. the (Frenchines) Company; 3. the Hughes Aircraft and McDonnell Company; and 4. the (Saha Wiriya) Company.

Mr Siphum said that this is the second time that private companies have been invited to submit bids. The first time was on 29 February, but the committee was not satisfied with any of the proposals submitted by the companies. Thus, it called for a second round of bids. Some of the conditions have been relaxed. The last day for submitting proposals is 31 October. It will take the committee about 4-6 months to consider the proposals submitted by the companies so that the cabinet can make a decision. In considering the proposals, the committee will adhere primarily to the original conditions. If none of the committees submits a satisfactory proposal, this project will be cancelled. Instead, we will continue renting a satellite.

Mr Siphum said that the committee set the following conditions: 1. The Ministry of Communications will not provide any support funds to the company that is granted the concession. 2. The company granted the concession must obtain the investment capital by itself. 3. The Ministry of Communications will retain proprietary rights to the satellite's orbits and will sign a contract with the company allowing it to use the orbits for 30 years. 4. The Ministry of Communications wants to have the right to have one representative on the

company's executive committee. 5. The Ministry of Communications will contact and coordinate things with the units concerned both here and abroad. It will stipulate orbits, frequency bands, and so on as necessary. But before doing this, permission must first be obtained from the International Frequency Band Organization. 6. If the company granted the concession does not want to build a ground station itself, the Ministry of Communications will allow it to request the use of facilities of units subordinate to the ministry, such as the Communications Authority, and the Department of Public Relations. But the company must pay a suitable amount in compensation and provide its own equipment. 7. The Ministry of Communications will request permission from the minister in order to enable subordinate units to use the satellite stations built by the company. 8. The satellite must be used for communications purposes only. 9. The company must maintain and repair the satellite itself. 10. The company has the right to stipulate

the amount charged for using the satellite, but the amount must not be higher than that stipulated by the Ministry of Communications, which will use criteria used by other countries and which will make estimates based on project costs. 11. A foreign juristic person must register as a Thai company. 12. If there are remaining satellite orbits, the company can rent them to other countries. 13. The air and ground satellite systems will belong to the Ministry of Communications beginning on the day that they are built. 14. All the equipment must be inspected for quality. 15. The company must complete work on the satellite and have it ready for operation within 5 years.

Mr Siphum said that this satellite will be used for domestic communications only. A total of 3 billion baht will be invested. As for international communications, we will continue to rent the Intersat satellite, because we have already signed the contract.

CZECHOSLOVAKIA

Satellite Television To Go On-Line in 1990

23020035 East Berlin RADIO FERNSEHEN
ELEKTRONIK in German No 11, 1988 p 683

[Text] In the 1990's, pursuant to an agreement with the International Telecommunications Union (ITU), the CSSR plans to begin transmitting television programs via satellite. In this way, it will participate in the elaboration of the fundamental system approaches and technical principles for satellite transmission systems within the framework of the complex program for the scientific and technical progress of the CEMA member countries through the year 2000. The Soviet Union will provide most of the equipment for geostationary satellites.

The CSSR is conducting research in wave propagation for satellite television [signal] transmission; it also is working on the development of different types of ground stations for satellite television and is testing two cable network configurations in residential areas. By the early 1990's, there should be 80 ground stations to receive the signals from space and relay them in the conventional manner.

The next stage in the development of satellite television is to begin around the year 2000, with the transmission of television programs over four or five channels. At present, the CSSR has two television channels. One channel can be picked up in around 95 percent of the country's territory, where over 98 percent of the CSSR's citizens live; the other channel is picked up by 75 percent of the CSSR's citizens.

BRAZIL

Seven Satellites To Be Launched by 1995

33420010z Sao Paulo O ESTADO DE SAO PAULO
in Portuguese 12 Nov 88 p 18

[Text] Rio—By 1995 Brazil will have launched seven Applications Technology Satellites and made plans for two more. This is the prediction made by Marco Antonio Raupp, general manager of the National Institute of Space Research (INPE), at the international conference on "Technology: En Route to the 21st Century." Most of these satellites will be constructed by agreement with foreign research institutes. The most important of these agreements is the one signed with China for the launching of two satellites in 4 years; it gives Brazil access to high-propulsion technology for the launching of large satellites.

"The Brazilian Space Program," Raupp explains, "is oriented toward the use and development of Applications Technology Satellites. These are satellites used in telecommunications, search and rescue operations, meteorology, and exploring for mineral resources. "We have always had cooperation programs with NASA,"

Raupp says, "but the Chinese gave us a different option." With the USSR, the initial result will be research—in the Mir orbital station—on the growth of crystals in microgravity.

INPE is currently receiving pictures from three satellites (two American and one European). For the development of national satellites, the Institute has had a budget of \$20 million per year since 1983.

According to Paulo Edmur Pollini, vice president of Telebras [Brazilian Telecommunications, Inc.], computer technology and telecommunications are increasingly linked, with the latter benefiting from the development of integrated circuits. In order not to lose the race to develop this sector, Brazil needs to recognize and take advantage of technological opportunities. "The world model," Pollini says, "does not serve us well. The other countries are able to develop products, which are subsequently sold everywhere. Large-scale industries invest billions of dollars in research. In Brazil it's different. This year we have invested Cz\$60 million. That's not very much."

In the opinion of the Telebras vice president, if Brazil is to enter the 21st century with a sophisticated, modern telecommunications system, it must carry out specific projects in the fields of integrated circuits, digital telephony, and cellular telephones.

INDIA

Center for Development of Telematics Advanced
55500028 Madras *THE HINDU* in English
21 Oct 88 p 8

[Text] Four years after it obtained a mandate from the Government to develop from scratch the entire range of digital telephone exchanges in 36 months, the Centre for the Development of Telematics (C-DOT) has received its official report card from the Department of Telecommunications. At first blush, it might appear that many an import lobbyist, who had poured scorn on the idea that a group of inexperienced engineers could succeed where others had failed, has been vindicated. The report by an interdepartmental committee has found serious time overruns in the readying of the various prototypes for mass production, as well as the fact that the product does not match some of the specifications originally set out in the charter. Four types of exchanges were to be produced: a 128-port model for the PABX market, another for the rural automatic exchange (RAX), a 512-port version for district headquarters and other small towns and a main automatic exchange of sizes in multiples of 512 going up to 16,000 ports. The first two are already in commercial production, but the other two are at least a year behind schedule. One of the crucial merits of the C-DOT design was to be its ability to work in high temperature conditions. But the prototype of the 128 port RAX tripped on this score during tests last March and had to be modified. And there is still a question mark on whether the produce will have the capability to handle the heavy traffic encountered in the metropolitan exchanges; the latest tests suggest the 512-port exchange performs at barely 60 per cent of the desired efficiency.

Having said that, there is no warrant for dubbing the C-DOT experiment a failure. The band of a few hundred young—their average age is just 23—dedicated engineers at C-DOT have not come up empty-handed. Far from it. Take the 128 port PABX. Several manufacturers in the private sector are making the PABXs. The Rural Automatic Exchange (RAX) version is being produced at ITI, Bangalore, since April this year. It is true that production may not be proceeding as swiftly as envisaged, the scheme to install one RAX a day in rural clusters round the country therefore has not materialised at that pace, and consequently some imports are being resorted to till the breach. But one cannot blame the C-DOT for this delay. Apparently the problem lies in the ITI getting clearance for the import of certain components that go into the RAXs. Despite C-DOT's admirable attempt to ensure components are made indigenously—the committee has acknowledged the effort in this direction—a minor proportion of the components will still come from abroad. It is the 512 port version, whose prototype has been undergoing field trials since December last year, that does not seem to measure up to standards—specifically, it falls short of the ability to handle the prescribed 10,000 calling attempts in the busy hour. C-DOT has claimed that the current software is able to handle 6,000

attempts and is confident of coming up with refined editions that will comply with the specification. However, the Committee does not believe it can. This is one of the biggest challenges that C-DOT will face as it moves into its fifth year. Meeting this specification may not be as important in an exchange of this size as it is in the case of the 16,000 port exchange which is essentially built with modules of the 512 port version, for this large exchange is to cater to the metropolitan phone user with claims to some of the highest calling rates in the world. To succeed here would be to win convincingly the larger argument that state-of-the-art technology need not necessarily have to be imported. C-DOT need not be bothered unduly by the fact that it will release the 16,000 port exchange for bulk production only in 1990-91, more than a year behind schedule. Time overruns are hardly peculiar to indigenous technology. If the Mahanagar Telephone Nigams in New Delhi and Bombay are to import 90,000 lines this year, it is partly because ITI's 5 lakh lines a year plant at Mankapur, which builds electronic exchanges with French technology, is struggling to catch up with the original production schedules. Yet it is imperative that C-DOT succeeds, for both this and the French technology need to be harnessed to the full in order that the Eighth Plan target of installing 50 lakh exchange lines may be attained.

Telecommunications Research Center Bifurcated
55500031 Calcutta *THE TELEGRAPH* in English
1 Dec 88 p 8

[Article by K. K. Sharma: "Telecom Research Centre Bifurcated"]

[Text] New Delhi, Nov. 30: The government feels it has taken a wise decision in bifurcating the Telecommunication Research Centre under the ministry of communications. The centre was set up in 1955 for undertaking basic research and development in the field of telecommunications and to furnish the necessary higher level technical support to the department.

Although valuable work was done by the centre over the years, a basic conflict in the two roles of the centre was observed in actual practice. To overcome the shortcomings and bring back the focus on the two important but separate activities and make the organisation more performance-oriented it was decided to reorganise the existing Telecommunication research Centre into two separate units.

The two units are the Telecommunication Engineering Centre and the Telecommunication Research Centre. The engineering centre will be a science and technology institution in terms of the instructions issued by the scientific advisory committee to the cabinet and will continue to work as a part of the Department of Telecommunications.

The new truncated telecommunications research centre will be an autonomous scientific society with total authority and flexibility. This society will be funded by the Department of Telecommunications and registered.

Loan for Telecom Imports: World Bank Impressed
55500029 Madras THE HINDU in English
28 Oct 88 p 7

[Text] An official delegation of the Department of Telecommunications (DOT), headed by its Secretary, Mr. Satya Pal, which returned from Washington late last week has successfully impressed upon the World Bank the need to change the scope of items listed for import under the Bank's 9th loan of \$345 millions to the DOT, sanctioned in June 1987, following increased indigenous availability of certain items and the steep fall in the global prices of selected telecommunication products.

The Department told the World Bank that items like dehydrators, automatic message accounting machines and small earth stations should be deleted from the original list of products cleared for imports under the Bank loan. These are now manufactured and available indigenously. Besides, the optical fibre prices in the international markets had come down by more than 60 per cent since the time a global tender was floated for this item more than a year and a half ago.

Raw materials and components: A combination of these two factors alone has brought about a saving of \$50 to 60 millions. DOT has, therefore, requested the World Bank that it should be permitted to use this saving to import other raw materials and components and ITI's requirements which were not listed in the original loan agreement. Accordingly, the World Bank has asked the DOT to send it a revised list of items which it proposed to import following the saving on other items. DOT officials are hopeful that their request would be considered favourably.

The \$345 millions loan was basically meant for the telecommunication needs of the four metropolitan cities of Delhi, Bombay, Calcutta and Madras and for inter-connecting them. One of the items agreed for import was automatic message accounting machines (AMAM) used for detailed billing of telephone subscribers. It is known that many of the exchanges in these cities were going electronic though there were still many crossbar and Strowger exchanges to be replaced.

Indigenous production: While the electronic exchanges have an in-built system for billing, it was not so in the other two categories. DOT officials said usually the World Bank, prior to the actual signing of the loan agreement with the country concerned, advised taking of advance action for procurement of some of the required products and equipment.

But in the case of the loan for DOT's requirements, these items are since being manufactured indigenously. The decision to delete items like AMAM, dehydrators and small earth stations, which are being made by ITI, has to be viewed in this context, they explained.

Optical fibre surplus: Referring to optical fibre, they said that at present there was a surplus production worldwide and soon there may be a situation of this item being sold at dumping prices. The tender floated earlier was meant for connecting Delhi and Bombay and the junctions at the four metropolitan cities. Along with the fall in the global prices of optical fibre, capacities are also being set up in the country for its manufacture. DOT cannot import more of optical fibre because of the World Bank's restriction both on the quantity and finance earmarked for a particular product cleared for import.

The Department has now also placed orders on Hindustan Cables Limited which is setting up an optical fibre unit at Naini and on the Madhya Pradesh State Electronic Development Corporation (MPSEDC), which also proposes to make this fibre. Trial orders of 200 km each of optical fibre have reported to have been placed on Hindustan Cables Limited and MPSEDC.

The ninth loan of \$345 millions is strictly meant for transmission equipment and components and does not cover the switching area. Advance action has been taken for items like underground cables, digital microwave equipment, optical fibres, etc. Besides, under the loan agreement, DOT is also going in for packet switching data network and network management system. The present analogue stations are to be replaced by digital earth stations.

Regarding the proposal to import raw materials and components. DOT is preparing a list of items to be considered by the World Bank. The components include integrated circuits and connectors and the Chandigarh based public sector Semiconductor Limited is not in a position to supply these within the desired time schedule, DOT feels.

Telecom Profile for Next Plan Drafted
55500030 Madras THE HINDU in English
12 Nov 88 p 11

[Text] broad framework—including a proposal to commission 50 lakh direct exchange lines (DEL), replacement of all manual exchanges by automatic exchanges, telephones on demand in rural, backward, hilly and tribal areas. STD facility for all exchanges with 500 lines and more, besides replacement of all Penta-Conta Trunk Automatic Exchanges (TAX) by Digital TAXs—has been drawn up by the Department of Telecommunications (DOT) for implementation during the Eighth Plan (1990-95).

Though replacement of life-expired or wornout exchanges is an ongoing process, the grand scale at which it is sought to be done will be subject to availability of funds. Considering the performance of Mankapur switching unit and the inordinate delay in setting up a second ESS factory besides the time overrun in commercialising indigenously designed smaller exchanges has given rise to fears that the global giants would continue to have a major hold on the country's telecom market.

The "tentative objectives" cover the needs of local switching network, long distance switching and transmission, telex and telegraph network besides the manpower needs to service DELs. According to DOT, the country's telecom network is likely to have about 2.73 lakh manual lines at the beginning of April 1990, which would be replaced by automatic exchanges by the end of the Eighth Plan in March 1995. In the plan period it is proposed to give telephone on demand in rural, backward, hilly and tribal areas based on the 1981 census.

Further, in local switching network, installation of new exchanges and expansion of existing ones would be planned keeping in view factors like demand for exchanges with capacity of 5000 lines and above as in April 1988 and projected demand up to 31 March 1994 to be cleared by the end of the plan and provision of telephone on demand by March 1995 for exchanges below 5000 lines. The other factors that would govern local network include resource consumption ability, principle of balanced development, rate of return on investments and provision of industrial growth centres. While DOT expects to provide Long Distance Public Telephones (LDPT) in all inhabited hexagons by March 1992, all primary, secondary and junction cables would be ducted in all cities with a population of 100,000 and above.

STD at tourist centres: In the area of long distance switching, all sub-divisional Headquarters or equivalent block development offices and tehsils would be provided with STD facilities irrespective of their exchange capacities. Moreover, all exchanges with capacity of 500 lines or more as in April 1990 are to be provided with STD facility. While the full complement of Penta-Conta TAXs would be replaced by Digital TAXs, it is also proposed to install STD Public Call Offices (PCOs) at all tourist and pilgrimage centres.

The department proposes to link all sub-divisional Headquarters and exchanges with capacity of 500 or more lines to the national network by 'reliable transmission links' and provide satellite station at such headquarters where other terrestrial links are not feasible. A major effort would be made to replace all coaxial/microwave equipment installed in 1975 and which are due for replacement by March 1995 during the course of the Eighth Plan.

Network synchronisation and common channel signalling would be built into the telecom network so that ISDN could be introduced at a later date. Incidentally, DOT officials are not hopeful of ISDN becoming operational on a national scale even by the end of the Eighth Plan.

All telex exchanges will go electronic by the end of the plan and first priority would be to State capitals followed by exchanges where expansion is programmed. Besides, telex concentrators from 100 to 400 lines would be planned wherever replacement/expansion of existing strowger telex is anticipated. All district headquarters will have access to telex network by installation of telex PCOs.

Regarding manpower planning, the likely number of staff per 1000 DELs at the end of the Seventh plan now projected at 75 is expected to be progressively reduced to 55 by the end of the Eighth Plan. The staff figures do not include those employed in telegraph traffic and telecom factory.

Not rejected: Under the programme of replacing all life-expired strowger and cross-bar exchanges which have completed a quarter century DOT in the remaining two years of the Seventh plan, that is 1988-89 and 1989-90, hopes to replace 1,93,500 lines of MAX I, 50,100 lines of MAX II and 20,840 lines of manual exchanges. Further, in the next two years 350 C-DOT designed and developed 128 port Rural Automatic Exchanges (RAX) three 512 port ILT exchanges developed by ITI would replace the smaller wornout exchanges. Surprisingly a number of outlived strowger exchanges removed from major metros are being reinstalled in certain other towns and cities.

A major requirement of the country is to provide telephone system in the rural and semi-urban areas. So far the equipment manufactured in the country were of analogue type and of late digital exchanges of smaller size have been developed by C-DOT and TRC/ITI. DOT has now decided that all future production of small digital exchanges will be based on these technologies.

The department has booked the entire production capacity of ITI for the current financial year and placed firm orders for 294 units of C-DOT's 128 port RAX to roughly yield 30,000 lines. The ITI in cooperation with TRC has successfully produced digital exchange equipment suitable for working from 64 to 2000 lines. While a few exchanges have been inducted into the network for detailed evaluation, purchase orders have reportedly been placed on ITI for supply of 40,000 lines exchange equipment in different capacities.

In the last three calendar years DOT on an average imported 30,000 lines each to upgrade the rural and semi-urban telephone system. The imports were mostly NEAX which is a small digital exchange expandable up to 1500 lines. At a recent meeting of the consultative

committee attached to the Ministry of Communications, the members were informed that 'on account of extremely good performance and demand from the public for this type of equipment, additional 33,200 lines are being imported during the current year.'

The second technology mission of C-DOT has been approved to cover the remaining two years of the Seventh Plan. An investment of Rs. 32 crores has been cleared for the purpose. Under the new mission, C-DOT proposes to conduct field trial of C-DOT Main Automatic Exchange and its technology transfer, broaden the Centre's Digital Switching System family to include Remote Switching Unit (RSU), Trunk Automatic Exchange (TAX) and large PABX. It also hopes to introduce telematic of ISDN facilities in C-DOT digital switching products.

During the Seventh Plan, DOT has proposed to install 4950 new rural exchanges in the country. As on 1 April 1988 nearly 2107 rural exchanges had been opened and the progress was slow because of non-availability of exchange equipment and delays in indigenous effort. It is now proposed to install roughly 2000 more rural exchanges before the end of March 1990. Apart from this another 900 C-DOT 128 port RAX and 700 mini ILTs developed by ITI is expected to be commissioned during 1988-90.

Communications Satellite To Be Launched in Spring

*BK2512160988 Delhi Domestic Service
in English 1530 GMT 25 Dec 88*

[Text] Work is in full swing for the launching of the Indian communication satellite - INSAT-1D - in April or May next year. It will be the last satellite in the INSAT-1 series and is being replaced by the indigenous INSAT-2 series.

Disclosing this to newsmen, the chairman of ISRO [India Space Research Organization], Professor U.R. Rao, said in New Delhi that the launching of INSAT-1D has become essential due to the fact that the life of INSAT-1B is to expire by September next year and the partial success of INSAT-1C.

Two TV Relay Stations Commissioned

Gujarat Station

*BK0402063989 Delhi Domestic Service
in English 0435 GMT 4 Feb 89*

[Text] Two more low power TV relay centers are being commissioned in Gujarat today. With this, the number of such centers in the state will go up to 15. The new centers at Porbandar and Junagarh will be inaugurated by the minister for information and broadcasting, Mr H.K.L. Bhagat.

Uttar Pradesh Station

*BK0502130589 Delhi Domestic Service in English
1230 GMT 5 Feb 89*

[Excerpt] In Uttar Pradesh, a low power TV transmitter was inaugurated at Hardoi today. It is expected to provide services within a range of 25 kilometers. It will relay programs from New Delhi by the INSAT-1B. [passage omitted]

Agra Station of All India Radio Inaugurated

*BK1601161289 Delhi Domestic Service
in English 1530 GMT 16 Jan 89*

[Text] The Agra station of All India Radio started functioning this afternoon. This is the 96th AIR station in the country and 10th in Uttar Pradesh. Initially, programs will be broadcast for 5 and ½ hours from 1730 [1200 GMT].

Inaugurating it, the information and broadcasting minister, Mr H.K.L. Bhagat, said AIR is close to its aim of ensuring round-the-clock service throughout the country. He said several steps are being taken to develop broadcasting units.

IRAN

New Radio, TV Relay Stations Operational

*LD0602105489 Tehran Domestic Service in Persian
0730 GMT 6 Feb 89*

[Text] Two television relay stations, in the (Oliya') region of Hamadan, were put into operation through the efforts of the technicians of the television and FM transmitters repair and maintenance unit of the Voice and Vision of Hamadan.

According to the Central News Unit, with the installation and functioning of these relay stations, each of which has a 50 watt [as heard] capacity, the residents of the villages adjacent to the sugar refinery, the martyr Nozheh air garrison of Hamadan, and the town of Razan will be able to benefit from the programs of the first network on Channel 10 and of the second network on Channel 6.

In addition, the use of the new Pavdana television relay station, with a 50 watt [as heard] capacity, began in Zarand in order to improve the quality of the first and second Voice and Vision networks' coverage. With the use of that station, the residents of Zarand, Pavdana, and surrounding villages will be able to benefit from good quality reception of the vision's first network on Channel 6 and the second network on Channel 10.

Through the efforts of the television and FM transmitters repair and maintenance unit of Zahedan, the town of Khash, too, can receive the Vision of the Islamic Republic of Iran's second network.

In addition, the FM radio transmitters of Maragheh and Azarshahr have been put into operation. According to the Central News Unit, with the use of Azarshahr's FM transmitters, with a 1 kilowatt capacity, the regions of Azarshahr, Bonab, Khosroshahr, Gavgan, (Ajafshir), Miyandoab, and Malekan, and with the FM radio transmitter of Maragheh, with a 50 watt capacity, the town of Maragheh and its environs can receive the local programs of the Tabriz center.

New Radio, Television Facilities Operational

Khorramabad Center

*LD0702175589 Tehran Domestic Service in Persian
1630 GMT 7 Feb 89*

[Text] The radio and television production center at Khorramabad was declared operational during a ceremony attended by the director of the Voice and Vision of the Islamic Republic of Iran, several Majlis deputies, and a number of local officials. Mr. Hashemi, director of the Voice and Vision of the Islamic Republic, said in an interview with the Central News Unit:

The Khorramabad production and distribution center can broadcast 6 hours of good quality radio programs per day and 2 hours of television programs per week. This center, which has become operational with a credit allocation of 700 million rials, has two radio studios and one television studio, and can now fill the cultural needs of Lorestan Province.

2 Shortwave Transmitters

*LD0802182589 Tehran Television Service in Persian
1600 GMT 8 Feb 89*

[Excerpt] Coinciding with the celebrations of the 10th anniversary of the victory of the Islamic revolution, from today 2,500 kw shortwave radio transmitters were inaugurated in Kamalabad in Karaj. [passage omitted]

Yazd Facility

*LD3012234388 Tehran Domestic Service
in Persian 1030 GMT 30 Dec 88*

[Excerpt] The 50 kw transmitter of Yazd center became operational this morning in the presence of Mohamed Hashemi, managing director of the Voice and Vision of the Islamic Republic of Iran. [passage omitted]

Communications Modernization Planned

*55004702 Tehran ETTELA'AT in Persian
14 Nov 88 p 4*

[Text] Khoram Abad - Fiber Optics, which is among the advanced communications equipment in today's world, will replace cables in the country's communications.

According to a report by IRNA, engineer Gharazi minister of post, telegraph and telephone made this announcement during a seminar on satellites in Khoram

Abad. He said: the construction stage of this advanced communications system is in the process of completion in Yazd province, and by the end of the current year will reach the stage of production and will be presented to the market for consumption. He said: a fiber optic strand with the thickness of one human hair has the communications capacity of ten thousand pairs of wires, which would normally be contained in one thick cable.

OMAN

Accomplishments in Telecommunications Discussed

55004507 Muscat AL-WATAN in Arabic 18 Nov 88 p 5

[Interview with Ahmad bin Suwaydan al-Baluchi, minister of posts, telegraphs, and telephones, on occasion of 18th National Holiday, by Mu'min Khalifah; date and place not given]

[Text] After the passage of 18 years in the life of our blessed awakening, we can now say that our achievements in the area of posts, telegraphs, and telephones have exceeded all fantasies and expectations. These things have proliferated everywhere in the lands of our beloved Oman. We have a modern communications network whose efficiency and performance do not fall short of the most modern international networks in the area of communications.

Two large projects were completed this year in the area of telephone communications: the rural communications extension project, providing 27,712 telephone lines, and the al-Batinah Coast project, providing 16,680 lines.

If we review what has been accomplished in the area of posts, telegraphs, and telephones since the time of the blessed awakening, there are too many achievements to be described.

In the area of posts, the Third 5-year development plan includes the construction of many modern post offices in Muscat, the interior and southern regions, and Musandam. About 50 new offices will be constructed so that mail service will cover all areas of the country.

In this interview, His Excellency Ahmad bin Suwaydan al-Baluchi, minister of posts, telegraphs, and telephones, throws light on the achievements of our blessed awakening in this vital area.

[AL-WATAN] Can you tell us about communications services in the sultanate and how they have developed and broadened, particularly since we know that they were virtually nonexistent just before the dawn of the blessed awakening?

[Al-Baluchi] A comparison between the state of telecommunications before the time of the blessed awakening and afterwards will be amazing by all criteria, particularly if we realize, for example, that there were only 500 telephone lines and 14 telex lines in the sultanate before the time of the awakening.

After the blessed awakening, in accordance with the sound directives of the builder of modern Oman's awakening, we began tireless work to bring communications services to all parts of the sultanate. What we wanted indeed took place. Thus the sultanate has come to enjoy a communications network as efficient, accurate, and rapid as international networks. Reality bears witness to this, and figures confirm it.

In the area of telephone connections, for example, we find that maximum telephone capacity in the sultanate at the end of August 1988 was 121,474 lines, while the total number of operating connections was 74,000 lines. We want our plan to be comprehensive. We do not concentrate only on Muscat and the big cities; our view takes in the entire sultanate. We have recently completed two large projects. The first is the rural communications extension project, providing 27,712 telephone lines. The second is the al-Batinah Coast and Qurayat project, providing 16,680 telephone lines. Work on these two projects has been finished, and residents of these areas now enjoy telephone service.

Ground Stations Complex for International Communications

In 1985, we introduced the mobile telephone system, which now covers almost all areas of the sultanate. The mobile telephone exchange has a capacity of 4,500 lines and can be expanded. Citizen interest in this service has increased since the lowering of its rate last May.

As a convenience to citizens, we have installed public telephones. We want to distribute them throughout the sultanate so that 24-hour telephone service will be available to citizens everywhere.

In 1970 there was not a single ground station in the sultanate; now we have a ground station complex for international communications operating over international and Arab satellites. Any subscriber can now contact most countries of the world directly.

Communications services are not restricted to the telephone. There are also telex services, data exchange by computer, and other services that the agency offers. The telex exchange has a capacity of 3,052 lines this year (1988), compared with 14 in 1970. Whereas formerly there was only one telegraph office in Muscat, telegraph services have now been provided throughout the sultanate.

309,000 Riyals a Year for Arabsat

[AL-WATAN] Your Excellency, we know that the sultanate is considered to be one of the first countries in the area to use the satellite in its internal telecommunications network. Can you give us a simplified idea about satellite stations in the sultanate and their economic benefit?

[Al-Baluchi] Domestic satellite transmission for television and telecommunications has been used for several years. There are eight ground stations for domestic communications in the sultanate, located in various areas.

There are the two Wadi al-'Amirat stations in Muscat and al-Ma'murah in Salalah, which have been equipped for television transmission and reception in addition to telecommunications. The Khasab and Masirah stations are used for telecommunications and for television reception. The Sahm, Nizwa, Sur, and al-Buraymi stations operate only for television reception.

The internal network for space communications has helped bring distant and remote places in the sultanate closer together, helping citizens communicate among themselves quickly and easily. It has enabled business and administrative centers to carry on their work effectively. The system has also played an important role in spreading knowledge, learning, and entertainment, especially in rural communities, through television and radio programs.

The sultanate pays approximately 309,000 Omani riyals a year to the Arab Space Communications Organization (Arabsat) for use of the Arabsat satellite domestically. Three-quarters of this use is devoted to television, the rest to telecommunications. The Ministry of Information and the Ministry of Posts, Telegraphs, and Telephones contribute to paying this sum.

Al-Hajar satellite station, which operates with the Arab satellite Arabsat, has brought great benefits to the sultanate. It facilitates the exchange of television, telex, and telephone services between the sultanate and certain member countries. At present, there are communications with such member countries as Saudi Arabia, Kuwait, Bahrain, the UAE, Qatar, and Jordan. There will soon be an exchange of these services with Djibouti. We will exchange services with the remaining member countries when their ground stations are ready to operate.

We also have a station to provide local communications in some of the ground stations in the sultanate—for example, the ones located in Salalah, Masirah Island, and Khasab.

Subscribers Benefit From Lowered Rates

[AL-WATAN] A few months ago, Your Excellency issued an decision reducing the rate for telephone calls. This decision has had a great impact on all citizens. Can Your Excellency throw light on this subject?

[Al-Baluchi] Before implementation of the new rate in the middle of last July, the domestic telephone rate was based on road and transmission line distances between the various telephone exchanges within the sultanate. The Muscat area did not enter this framework, since each telephone call in the area between the city of Muscat and al-Sib Airport counted as one unit, priced at 30 baysahs.

We learned from experience that open calls cause the telephone network to be misused and all of its lines to be employed at once, which leads to increased maintenance costs to preserve the level and quality of the network.

As a result of the modernization and expansion of the telephone network, we realized that the rate had to be based on radial distance zones or the shortest path (i.e., distances measured on a straight line between the originating and destination exchanges). We have in this way brought about equality between all subscribers in the country.

Under this system, telephone call time units and their prices for all areas have been defined. Charges per unit have been reduced to 25 baysahs, instead of 30, for each 6 minutes during the day, or 9 minutes during the night, for calls made within a zone of 20 km. As the distance increases beyond that, the price of a unit increases.

The rate adjustment applied not only to ordinary telephones, but also to mobile telephones and data exchange. We had already reduced the telex rate previously.

We are certain that nearly all subscribers are benefitting from the change in the rate.

Sultanate, an Active Member in International Organizations

[AL-WATAN] Your Excellency, can you tell us about the extent to which the Ministry of Posts, Telegraphs, and Telephones and the General Agency for Telecommunications have taken advantage of long international experience? In what international organizations and agencies are they members?

[Al-Baluchi] As you know, the communications network in the sultanate is an integral part of the international network. This of course requires that we design and construct our network in a way that enables us to conform and harmonize with the networks of other

countries. The sultanate has therefore joined the organizations concerned with developing and operating communications in our region and the world generally.

The sultanate is an active member in the International Communications Union, which is a UN agency specializing in supervising international communications and in making recommendations needed to maintain harmony between parts of the network for communications exchange between countries of the world.

Since we use the satellite system, we have joined the organizations concerned with managing and operating satellite systems, such as Intelsat, Arabsat, Anmarsat, and others. We participate in the operations system planning and development activities of these organizations and, as direct users of this system, do all we can to implement operational plans in accordance with the programs defined.

We are also members in other regional agencies and unions, such as the Arab Telecommunications Union, the Arabian Gulf Cooperation Council, and the Islamic Conference Organization.

Our membership in these organizations has facilitated our dealings with our fellow countries and a rapid and good solution to communications problems.

Growth and Development Will Not Cease

[AL-WATAN] Your Excellency, after 18 years of progress, do you think you have achieved most [of what has to be achieved], or do many projects soon to be implemented (God willing!) remain on the ministry's agenda?

[Al-Baluchi] Certainly, the enormous achievements of 18 years of triumphant progress have encompassed all public and private utilities in all areas of the country.

We in the Ministry of Posts, Telegraphs, and Telephones and the General Agency for Telecommunications have implemented many projects to develop this important utility. This becomes readily apparent if one looks at the size of the communications network today, compared with the situation before the dawn of the glorious awakening.

Future projects are numerous, for the course of growth and development will never cease, God willing! The agency is now preparing final studies to begin the project of expanding the telephone network on the al-Batinah coast and the Salalah area. With God's help, these expansions will be implemented in the next few years. Other studies are being done to guarantee that communications services in general and telephone service in particular are available to all citizens and all sectors, private and public, in the country.

I would also like to mention that we have taken a great step toward filling managerial and technical positions with Omanis, replacing foreigners with citizens everywhere. Work continues toward filling positions 100 percent with Omanis in implementation of the sultan's royal directives.

[AL-WATAN] When shall we be able to say that the communications network in our country has covered all areas of the country?

[Al-Baluchi] After implementation of the al-Batinah coast project, I can say that we have covered all the principal cities of the sultanate. Afterwards, there will be small villages. We will extend service to them in accordance with the plans that have been laid out. In implementing communications projects, we take a number of important things into account. Projects are not implemented haphazardly. We are all aware of how difficult it is to implement projects, given the desert nature of our country. We therefore began with Muscat and Salalah. Next came the communications development project in the interior regions, and we undertook coverage of all principal important cities.

We began with the al-Batinah coast project. And so it will go, until with God's help we are able to extend service to every city and village in the sultanate. That is the goal to which we always aspire.

Many Projects in Our Third 5-Year Plan

[AL-WATAN] What about the Third 5-Year plan in your ministry? What are its projects until the plan's end in 1990?

[Al-Baluchi] There will be many projects for the Third 5-year plan. We plan to extend communications services to every place in the sultanate, so as to cover it from end to end with every such service. We are not concentrating only on Muscat.

For example, the al-Batinah coast project will provide 16,680 lines in its first phase—in Sahm, Barka', al-Khaburah, al-Suwayq, Qurayat, al-Rustaq, and certain secondary villages. The goal is to implement this during the first phase of the Third 5-year plan.

Additional evidence of our interest in the interior areas is the scheduled completion of the interior areas' communications development project during the Third 5-year plan. This project will serve 39 cities and villages and provide 27,712 lines. The plan will also see the implementation of some expansions of existing exchanges.

A basic study of telecommunications development in the sultanate until the year 2005 is under way. We are now evaluating that study in all its aspects.

Thus, work never ceases. We never lose hope—hope of making our country reach the level we all wish for it.

SAUDI ARABIA

Development of National Telecommunications System Reported

Links Described

55004509 Jeddah ARAB NEWS in English 18 Dec 88

[Article by Muhammad Ibrahim]

[Text] With more than 1.368 million operating telephone lines serving about 400 towns and villages and linking the Kingdom with about 180 countries around the globe, more than 30,000 telex lines, a network of more than 15,000 kilometers of microwave lines with a capacity of 50,000 circuits including two TV channels, more than 5,000 kms of coaxial cables accommodating 25,000 circuits, 7 standard "A" satellite earth stations, 6 non-standard earth stations used for domestic and special telecommunications and more than 6,000 satellite circuits. Saudi Arabia now ranks the world's fifth largest user of satellite telecommunication facilities.

In addition to these, there is the 15,000-km-long continental submarine cable extending from Singapore in the east to France in the west through the Red Sea coastal city of Jeddah which will provide the Kingdom with more than 1,800 circuits of which 480 lines will be used for communications with Egypt.

To make this tangible achievement possible, the PTT Ministry has spent more than SR58 billion during the last four five-year development plans.

PTT Minister 'Ulwi Daswish Kayal said this spectacular development was realized through close and consistent support and follow-up by Custodian of the Two Holy Mosques King Fahd and Crown Prince Abdullah who left no stone unturned for the welfare of citizens.

According to this advanced system of telecommunications, telephone calls with the rest of the world are carried with 98 percent success in the first attempt of dialing.

Dr Kayal recently told local Arabic Press that the ministry was planning to provide one million new telephone connections during the coming 10 years. This will increase the number of telephone lines in the Kingdom to more than 2.3 million which will further secure its place as a leading country in the realm of telecommunications.

He noted that about 40 telecommunications projects are currently under construction in various parts of the country at a cost of SR1.36 billion. They include an

SR450 million telephone expansion project, an SR168 million project in Riyadh, SR319 million projects in Qasim and Ha'il, an SR70 million scheme in Jeddah and others.

"A comprehensive survey conducted in various parts of the country has shown that at least one million more telephone connections should be provided in the coming decade to meet the ever growing demand for telephone service. The ministry wants to realize this target gradually by providing 100,000 connection every year," Dr Kayal told AL-JAZIRAH.

He noted that among the projects under construction were the establishment of new telephone cabins for international calls in many cities including Mecca, Madinah, Jeddah and others, purchase of maintenance vehicles at a cost of about SR36 million, securing various types of telephone cables, extending new telephone connections, setting up of workshops for the installation and maintenance of car telephones and others.

Dr Kayal underscored the giant strides made by the Kingdom in the domain of telecommunications in a short time and said, "Saudi Arabia now has a very modern electronic telecommunication system." He also stressed that the telecommunications means in the Kingdom are complete, comprehensive, integrated and capable of coping with the rapid development made by the world in this vital field.

He noted that the plans to modernize the telecommunication network was coupled with ambitious programs to provide high-technical training for the national cadres who constitute more than 65 percent of the 30,000 people employed by the ministry and its various branches.

Meanwhile, the opening of the King Fahd Satellite Telecommunications City in July 1987 has further augmented the Kingdom's position in the sphere of telecommunications. As a result, the Kingdom now has more than 6,000 circuits via satellite.

"More than 5,000 telephone circuits are available through these systems," Deputy PTT Minister Fu'ad Muhammad Nur Abu-Mansur recently told the Saudi Press Agency, adding that the Kingdom has also developed land-based international telecommunication facilities including coaxial cables and microwave systems with direct links to a number of neighboring countries.

With the four standard "A" satellite earth stations provided by the King Fahd Telecommunications City at Umm-al-Salam near Jeddah, the Kingdom now has seven of these stations. Previously there were two in Riyadh and one in Taif. These are in addition to six other non-standard earth stations used for local and special telecommunications.

With these facilities, thousands of people can simultaneously talk to the outside world with which more than 160 were linked through direct dialing and 21 others through exchange operators.

Furthermore, in a recent interview with TECHNICAL REVIEW-MIDDLE EAST MAGAZINE, Dr Kayal said Saudi Arabia was taking steps to ensure the proper evolution of its modern telecommunication system to integrated services digital network (ISDN). "As we want to develop toward the ISDN with the present network, the system we install must be able to keep pace with modern world-class developments," he added.

Dr Kayal recalled that the Kingdom had been participating for several years in various international study groups working on ISDN standards and that it was also organizing a subscribers' loop survey to obtain the data needed to plan ISDN access.

He said the Kingdom has established a new department which will be responsible for the new network service development including future ISDN services and added that the country was planning a pilot trial of ISDN to learn more about upgrading its existing switches and networks. "These exercises will enable us to determine the ultimate plan for the Kingdomwide ISDN," Dr Kayal said.

Dr Kayal also said the government wanted to add systems to the network "which can operate well in the rather tough environment of the country and can be upgraded in an economical manner."

Stations Described

55004509 Jeddah ARAB NEWS in English
18 Dec 88 p 8

[Article by Muhammad Ibrahim]

[Text] While going to Mecca on the expressway and when you are about 25 kilometers away from Jeddah, you will see on your right hand side a number of satellite dishes and antennae. This is the King Fahd Satellite Telecommunications City at Umm-al-Salam, the biggest complex of its kind in the Middle East and one of less than 200 worldwide. It consists of 4 dish antennae each to transmit and receive from 1 of the 4 international satellites: Arabsat, Inmarsat and Intelsat's Atlantic and the Indian Ocean satellites. It can handle more than 3,000 channels at the same time.

Custodian of the Two Holy Mosques King Fahd inaugurated the complex on 21 July, 1987, signaling the herald of a new era of development in this vital sector for Saudi Arabia which has become one of the leading countries in the domain of telecommunications.

SUDAN

The city has four standard "A" satellite earth stations, two to communicate with Intelsat, one with Arabsat and one with Inmarsat, the last being for marine, air and mobile telecommunications.

Besides serving the Kingdom's needs, these facilities have enabled Saudi Arabia to provide international transit services. As a result, the Kingdom has become the world's fifth largest user of satellite telecommunications facilities.

The city, which occupies an area of more than one million square meters, comprises a main building which houses the control center and management offices, a mosque, residential villas and back-up electricity power turbine generators.

It is connected with the Kingdom's public telecommunications network primarily by a state-of-the-art cable system employing the latest transmission technology. A digital microwave system forms a back-up link.

With the four satellite earth stations in the city, the Kingdom now has seven such stations. There are two in Riyadh and one in Taif. In addition, there are a number of non-standard earth stations used for domestic and special communications. The four earth stations in the city are as follows.

Arabsat Earth Station

It is the main telecommunication link with Arab countries which are members of the Arab Satellite Organization. It has a capacity of 850 circuits in addition to television reception and transmission facilities.

Intelsat Earth Station (Atlantic)

This station provides the means of communicating with countries in the Atlantic Ocean region. It has 1,400 telephone circuits in addition to television reception and transmission facilities.

Intelsat Station (Indian Ocean)

It is the means of communicating with countries in the Indian Ocean region. It has a capacity of 1,300 telephone circuits in addition to television reception and transmission facilities.

Inmarsat Earth Station

Through this station, communication is possible with marine vessels, aircraft and mobile vehicles via the public telecommunications network. It has an initial capacity of 12 telephone and 22 telex circuits which may be expanded. More than 5,000 subscribers used the facilities provided by this station since December 1986.

Report Explores Causes for Collapse of Telephone System

55004606 Khartoum AL-ASHIQQA' in Arabic
22 Nov 88 pp 15-18

[Article by Muhammad 'Abd-al-Rahman]

[Text] Telephone communications are considered the most significant mainstays of economic and social development and of maintaining the public's security and comfort. But these facts fall one after the other when applied, even if only theoretically, to the capital's telephone services.

Most of the capital's telephones have turned into skeletons, museum pieces or, if we may use the phrase, into something similar because they have been silent for a long time as a result of the incessant and ever-increasing breakdowns which have become worrisome to both the user and to the service provider.

With the continued presence of these breakdowns, the subscribers' hardship has intensified because these subscribers cannot use their telephones which they had hoped would be a source of comfort and which have turned instead into a source of concern before which they stand grieved, being unable to make these telephones function.

Establishments, companies, governmental and non-governmental agencies and individuals began to voice their complaints because of their dire need for telephones as a rapid means of communication but their complaints have been to no avail. It is not infrequently that subscribers have been compelled to use a means of transportation to deliver an urgent message and that fires have broken out in one quarter or another without anybody being able to call the fire squads and with the fires, consequently, burning everything in sight!

Considering that most business, banking, industrial and press transactions require rapid communications, the activities of the majority of these establishments have been impeded because they are unable to use the telephone services and because they have been compelled to devise other means that are more costly and that require greater effort and a longer time.

From 10 Percent to 95 Percent

Because telephones play a major role in the individual's and the group's life, we have conducted a serious investigation to find out the causes for the recurrent telephone breakdowns and for the deteriorating and failing work and we have interviewed Jalal 'Abd-al-Majid, the technical director of the South Khartoum District who has spoken to us about the dimensions and causes of the breakdowns. He said:

The South Khartoum District telephone exchange serves a large area which covers al-'Imarat, both the old and the new area, and the entire South Khartoum District up to Jabal al-Awliya'. The exchange is relatively new, considering that it was inaugurated in 1980, even though it had been in operation a little earlier. There is also the extension exchange which serves the areas of al-Riyad, al-Ta'if, (Arukwayt, the third development area), al-Sahafat, al-'Ashrah and Jabrah. These two exchanges serve the South Khartoum District.

Dead telephones in this district amounted to nearly 10 percent the number of telephones in operation. For example, the South District Exchange, which has an original capacity of 10,000 lines, was operating at a capacity of 7,400 lines. This means that 740 lines out of the 7,400 lines in operation were dead. In the extension exchange, which has a capacity of 5,000 lines, the dead lines amounted to nearly five percent the total number of lines in operation. The lines in operation were just a little less than this figure [presumably meaning 95 percent].

This continued to be the case until the recent rain and flooding catastrophe hit, causing terrible damage to the cables as a result of the seepage of water into the main and subsidiary cables. The cables in South Khartoum and in the extension stopped functioning.

As a result, there was a big increase in breakdowns and the number of dead telephone lines amounted to nearly 95 percent. It was difficult to move to repair the damages because of the flooding. We waited for the water to recede and then began our repair activities.

The repair activities are faced with numerous difficulties and problems. We consider the maintenance activities an endeavor to revive the dead. Despite the modernization introduced into the exchange, the network remained unchanged, thus affecting the performance standard in the exchange generally.

This is in addition to problems connected with the ground network, such as scarcity of the cable needed for maintenance operations and the shortage of equipment used in the work, not to mention the instability which the workers have experienced as a result of hardship in other areas of life and the impact of this instability on their performance standard. But despite the hardship and the difficulty they face, both the worker and the employee are committed to performing the role entrusted to them. There is a spirit of cooperation in the efforts made by the brothers at work to overcome the crisis.

Winds of Solution

Jalal went on to add: The solution is imminent. A German grant has, God be thanked, been received to modernize the central and South Khartoum networks.

All the procedures pertaining to this grant have been completed. God willing, this aid will end the problems we have experienced in the past 20 years.

Field Tour

To find out the causes of the breakdowns on the spot and considering that no main or side street is free of one or more holes connected with telephone cables, we toured al-Daym and the old South Khartoum areas and interviewed engineers Shams-al-Din Hamid, the engineer in charge of the Eastern District cables, and Muhammad Mudawwi, the engineer in charge of the Western District cables. They both noted that the breakdowns are due to cable corrosion, considering that a cable's life expectancy in 20 years and that these cables have been in operation since 1962. This means that the entire network has to be replaced to eliminate these breakdowns that are increasing day after day.

There is then the problem of coordination between government agencies. Cables have often broken down due to the lack of coordination between these agencies. We have suffered considerably from this problem. Some agencies engage in excavation without consulting us, thus damaging our cables and, consequently, causing further breakdowns.

Moreover, the citizen is a main contributor to the breakdowns. Some citizens carry out excavation work for new buildings and cut or damage the cables. Other citizens build right atop the cables, thus obstructing the maintenance work. There are problems connected with the maintenance operation itself, including the lack of materials, the evident shortage of trained labor and the unavailability of cables of all sizes.

The two engineers added that despite this hardship, major efforts are being exerted to repair the damages. It is hoped that the repair work will be completed at the earliest time possible, if the assisting elements are made available.

We Need a Lot

The development and progress of telephone services is tied to the workers because they are a segment which has its major role in enhancing the work. Because they are such an important segment, their practical problems and concerns are reflected on their work in one form or another. A number of these workers have summed up the most significant problems and obstacles hindering them, resulting in most of the breakdowns and obstructing the maintenance work they carry out at various sites.

The workers noted that they lack the simplest work requirements. For example, to repair damaged telephone lines, the workers are often compelled to purchase the tools they use with their own money even though it is not their responsibility to provide such tools. But for the sake of continuing the work, they are compelled to

purchase "wrenches" or "pliers" from the market "so that we may fix things," as they said. How can this tally with the nature of our work which requires the availability of such tools? How can some people stress that we must produce when we lack the production requirements?

The workers we interviewed went on to talk about their problems, noting that the equipment they use for maintenance is old, outdated and mostly inoperative. They added that at times they even ask the subscribers to provide detergents such as benzine and (paraffin) for no reason other than the fact that their requests [to their agencies] go unheeded. Citing an example, the workers said that they requested a locker in which to keep the subscribers' trusts so as to guard them against theft and loss and that their request has not been answered, not even with a negative response.

The workers then touched on the problem of (spare parts), their biggest concern. They stressed that they are unavailable, especially those that are heavily used. This makes them unable to provide the services needed to repair and maintain telephone lines.

The talk then turned to the workers' private problems. They noted that their primary problem is that of the suitable workplace. They have no offices and the site from which they launch their operations is temporary and lacks the simplest health requirements, such as ventilation and other elements. But they consider these to be secondary problems which can be solved with a little effort.

The most significant hardship they experience emanates from the living conditions themselves. Their salary is meager and does not exceed several mils when calculated according to the market conditions. Their low wages and the insane rise in the prices of essential goods and services has forced them to live a marginal life. They all have families to support and these families need essential things which the workers cannot provide because of their meager wages. The average monthly wage of a worker, plus all the allowances he gets, does not exceed 250 pounds even though most of the workers have been in the service for nearly 20 years.

Concluding their statements, the workers stressed that they are compelled to accept gifts from the subscribers to bridge the gap between their wages and the high market prices and to make up for the deficit that is many times their salary.

Exchange Breakdowns

If these are the causes and dimensions of the breakdowns outside the telephone exchange, then breakdowns occur within the exchange itself. In this regard, al-Hajj, a technical engineer at the South Khartoum telephone exchange, has said: The most important thing I want to note here is that this exchange is primarily and relatively

new. This is why it has not experienced major worrisome breakdowns. Most of the breakdowns, and they are few in number, result from dust and dirt and from the improper grounds surrounding the exchange. However, a major problem that hampers communication between subscribers is the problem of bottlenecks in the lines. This problem emanates from the fact that the number of subscribers exceeds the capacity of the apparatuses needed to get enough heat [energy] for the telephone lines. Though partially tackled by increasing the number of apparatuses to four, the problem has persisted as a result of external breakdowns in the networks. These breakdowns reflect on the telephone pedal. Any contact, whether in the ground or aerial networks, reflects on the thermal apparatuses in operation and one of the apparatuses becomes busy (when contact occurs between two cables outside the exchange, it is as if a subscriber has lifted his telephone receiver). Consequently, when more than one contact occurs, more than one apparatus gets busy and the subscribers lose their chance to communicate. Another problem from which the exchange suffers is the scarcity of spare parts. These are nearly the main causes for the breakdowns that occur within the exchange. They are subsidiary breakdowns that can be repaired quickly, easily and without much effort.

Linkage Problems

The digital microwave apparatus which links the various areas in South and Central Khartoum and in Khartoum Bahri and Omdurman experiences several problems, according to 'Arafah Muhammad al-Hasan, the P.C.M. engineer in South Khartoum. The most significant problem is that faced in maintenance due to the lack of spare parts. This is a problem that threatens to bring the apparatus to a halt in the near future. There are routine equipment maintenance operations that are supposed to be carried out daily. But we cannot carry them out because of some problems, including the scarcity of measurement equipment used in these cases.

This is why the routine maintenance operations that are supposed to be carried out periodically (every 6 months) to insure the efficiency of the equipment have also been suspended. These operations have not been carried out due to the unavailability of the instruments needed for the purpose.

We also suffer from the absence of coordination between the various agencies. This absence has caused the disruption of communication between Khartoum and South Khartoum for over a month. Some of the residences and office buildings constructed [recently] have blocked the path of the microwaves because of their height.

This is in addition to training problems. The system currently in operation is an Italian system which was installed long ago. To date, no workers have been trained on this system, at least on maintenance operations, to enhance the work efficiency.

Finally, we suffer from the lack of official interest in this type of equipment. The interest is focused totally on the cable and the external networks even though this is an important apparatus that links the areas with each other.

Subscriber Is Contributor

The telephone services are relatively limited when compared to the size of the capital's population. However, certain practices by some subscribers cause grave harm to other subscribers, according to Ahmad Sadiq Ahmad, the engineer in charge of the experimental (switchboard) which is considered the [telephone] agency's main axis and reflecting mirror. Through this board and these practices, the authority has found out that some subscribers needlessly monopolize a telephone line for long hours. For example, some subscribers use the telephone to play the latest [song] tapes they have gotten to somebody on the other end of the line. Some "chats" take the entire day, keeping in mind that telephone services do not belong to one person. When such a person monopolizes a line for a couple hours, he denies hundreds of other subscribers the benefit of the telephone services.

The fact is that the subscriber lacks education in this regard. We also have contributed to this deficiency because we have not enlightened the people. This is our responsibility.

Breakdowns in Omdurman

'Ali al-Hajj, the telephone manager of Omdurman area, has spoken about the breakdowns in this area, saying: There are fundamental facts that must be made known to everybody, namely that the telephone exchange and ground network's life expectancy ran out some time ago. For its operation, the exchange relies on the daily maintenance carried out by the workers. This exchange has a capacity of 7,000 lines, of which 3,000 lines are currently in operation. These are the lines repaired and restored to operation since the autumn floods. It is expected that by the end of this year, the number of lines in operation will rise to 80 percent. Should this be realized, it will be a major accomplishment for the exchange and the network.

Other elements have caused breakdowns. Insofar as the exchange is concerned, the lack of spare parts is one of the most significant obstacles impeding the efforts being made by the workers. The maintenance being carried out depends on the joint efforts of the exchange workers and engineers.

As for the network which relies on the workers' efforts [to keep operating], we suffer from the scarcity of cable of certain sizes. We try to use old cable for repair work, i.e. we try to do "patchup" work. Moreover, the workers lack excavation tools and other tools needed for maintenance work. We also suffer from the damage caused by the citizens and by some agencies which share the work with us. The citizens view the streets as if they are their private property and build part of their residences or shops on the streets, thus cutting and damaging the cables during excavation work. These problems greatly affect the external network.

There is a scientific fact concerning the Omdurman area, namely that it is an area that abounds with surface water which causes damage to the cables and which affects the network's performance. So far, no solution has been developed for this problem.

However, efforts are currently underway to modernize the exchange and the network. If these efforts are crowned with success, we expect all the telephone service problems to be eliminated. Al-Mahdiyah telephone exchange may be a model of the impact of modernization on the work. This exchange, which has a capacity of 4,000 lines, is operating very efficiently.

Performance Accompanied by Failure

Some engineers, including Murtada al-Jilani, an engineer at the Central Khartoum Technical Department and the Technical Engineers Union chairman, and Dumrah al-Nur, the union secretary general, have dealt with the causes of the telephone breakdowns from a different angle. They have said: These breakdowns and the other problems are a true reflection of the authority's general performance standard. The authority has failed to achieve the objectives for which it had been transformed from an agency to the Public Telecommunications Authority. Consequently, the service standard has declined and the authority's effort has deteriorated horribly. There is a prevalent conviction that the authority's effort in the area of telecommunications, especially in the administrative, engineering and financial aspects, has declined, deteriorated and failed. What concerns us here is the engineering aspect. We can sum up the causes of the authority's failure in this regard in the following:

First, the authority did not draw up the proper maps for the project to renew the cables of the nation's capital and of the other major cities—a project implemented in 1977 at a cost of \$17 million. This has exposed the capital to numerous and ceaseless breakdowns. In a single month in 1986, a total of 10,000 lines went dead. This year's breakdowns, especially in the wake of the destruction caused to the cables by the floods and rains, have exceeded the averages of past years even though the life expectancy of the new cables is nearly 40 years.

Second, being swept by the allegations of a modernization for which no plans had been made, the authority greatly neglected the old networks. This neglect led to their destruction. Consequently, we lost the old networks which had been functioning well. Meanwhile, the claims of modernization went with the wind and we have not reaped any fruit of the modernization yet.

Third, abysmal failure has accompanied the planning for the implementation and construction of the tri-city's telephone exchanges. The capacity of these exchanges is not compatible with the number of people wishing to use the service.

Some breakdowns developed in the digital microwave equipment during installation and experimentation. Communication between Khartoum and South Khartoum broke down because of the presence of a highrise on the signal channel. This shows clearly that coordination and planning are totally lacking in the authority's performance.

Fifth, the lack of energy and cooling caused numerous breakdowns and a number of stations, including al-Halafayah station which links Khartoum with all parts of Sudan, came to a halt. Moreover, the energy and cooling problems had a major impact on the stoppages in the

Shambat telephone exchange, the Khartoum microwave and the digital microwave exchange. The Khartoum exchange will come to a halt at the end of the winter if the air conditioning continues to be as it is at present.

This confusion which has accompanied the authority's performance and the lack of planning are the direct cause of the deterioration in the postal and telegraph services, especially the internal cable service. The local market and the citizens have lost confidence in the usefulness of the authority's services which are declining constantly.

EUROPEAN AFFAIRS

'Astra' Launch Evidence of European Success with Satellites

55002430 Frankfurt/Main FRANKFURTER
ALLGEMEINE in German 10 Dec 88 p 10

[Article by Ulrich Schulze]

[Text] The 27th launch of an Ariane rocket from the European spaceport in Kourou, French Guyana, represents a high point in what has become the daily routine of satellites: in addition to the British Defense Ministry's news satellite "Skynet," the satellite "Astra" made by the Luxembourg-based company Societe Europeenne des Satellites (SES) has been put into orbit. "Astra" is designed to transmit 16 television channels, which can then be received by small parabolic dish antennas, or fed into cable networks; SES has concluded a contract for the installation of receiver antennas with Detecon, the technical advisory company of the (West German) Federal Post Office.

Ten of "Astra's" 16 transponders have been rented—something quite new in the history of satellite transmission. For example, the French transmission satellite TDF 1 has been in space since the end of October, yet there has been no clarification to date concerning which programs will be broadcast. The Australian publisher Murdoch's "News International" company has booked four channels: one for "Sky Channel," with its programs "Arts," "Landscape," one for "Sky Radio," and "European Business Channel," one for "Sky News," "Sky Movies," and one for "Eurosport." These channels, which have been rented for a period of 10 years, will be capable of being received in the English language via the cable networks of Great Britain and Ireland. In conjunction with the Walt Disney Company, Murdoch has booked another channel, the "Disney Channel," which will concentrate on broadcasting cartoons (Mickey Mouse from early till late).

The London-based company W.H. Smith Television, would like to broadcast the multi-lingual, departmentalized channel "Screensport" and "Lifestyle," the first channel that deals exclusively with women's issues, via satellite. The Swedish company "Esselte" will transmit "Film-Net," a 24-hour movie channel. Scansat is taking two transponders for "TV 3," and for another program, the nature of which has not yet been disclosed in detail.

SES is the first, and to date, the only privately organized and privately financed European company whose purpose is the operation of satellites. The 15 shareholders include the Aachen and Munich-based holding company, as well as the Luxembourg branches of the Deutsche Bank and the Dresdner Bank. After raising capital in April, by its own account, the SES has 320 million marks at its disposal as proprietary funds. In addition to these funds, there is also a large loan from the Duchy of

Luxembourg. These funds will cover the costs of purchasing the satellite (an American model made by RCA), the construction and maintenance of reception and monitoring stations in Betzdorf near Luxembourg, all costs arising from the satellite's operation and from the operation of the reception stations.

The European character of the SES is reflected by the composition of its shareholders, but also by its avowed aim to use satellites to broadcast radio and television programs beyond the limits of national boundaries. More than 77 percent of the circa 120 million households of Western Europe that are equipped with television could, the director general of the SES, Meyrat said, be receiving programs via satellite by the end of January.

No German impresarios have as yet signed a contract; nor has anyone come forward who intends to beam programs to the German market from outside the country, but Meyrat is confident. He said he was "willing to bet anything" that before the year was over, a German-language transmitter would rent capacity on "Astra." If an impresario were to transmit programs from "Astra" in the German language, nearly 4 million viewers in the FRG could see them. The approval of the State governments has already been granted.

The European thought of this undertaking is anchored in a third aspect: It was the avowed will of the company to launch from Kourou with a European booster rocket. The spaceport there is little more than a flat space rested from the jungle. The small town of Cayenne might possibly have 10,000 inhabitants, but it has an airport at which the supersonic transport Concorde can land. Kourou is 38 km to the North. The tropical heat is a severe test for the nearly 1,000 workers of Arianespace, most of whom are French, but the French are enjoying success in their overseas territory. Of the 26 launches using Ariane (a type of rocket produced by a consortium in which France holds a majority interest), only two have been unsuccessful thus far. Various versions of the Ariane have put 41 satellites into space. Nine more launches are projected for 1989. Kourou has two launch pads. Rockets can blast off from there every 6 weeks. Is it any wonder that Arianespace's order books are full?

Philips Involved in 32 New ESPRIT Projects

3698A337 Groot-Bijgaarden DE STANDAARD in Dutch
25 Aug 88 p 15

[Unattributed article: "Philips' Participation in ESPRIT II Projects Amounts to 5.4 Billion Belgian Francs"]

[Text] Philips has announced that it is going to spend 885 man-years and BF 5.4 billion on 32 new projects in the fourth round of the ESPRIT program. Half of this amount will be contributed by the European Community.

The various projects will last between 1 and 5 years. On the issue of participation of Belgian laboratories, Philips referred to the Icarus project, in which both the Philips' Belgium laboratory and the "Faculte Notre Dame" of Namur are involved. Philips is the prime contractor of this project.

Research topics covered in the new projects include microelectronics (14 projects), advanced information processing (9), and applications such as computer-aided manufacturing (4) and office or home systems (5). Six projects are dubbed technology-integrated projects (TIPs). These are large-scale projects which "integrate several technology fields to design market-oriented products or systems."

Philips, which claims to be one of the major participants in ESPRIT II, acts as the prime contractor for eight new projects.

In microelectronics, it is leading a TIP aimed at the very fast design and production of complex systems on silicon chips. In this project, Philips is collaborating with Bosch, Bull, ES2 [European Silicon Structures], GEC [General Electric Company], Strathclyde University, and others.

Another project run by Philips involves standardization and testing of printed boards. According to Philips, Europe seeks to have a bigger say in the international standardization discussions through this project. Other project participants include the Danish Elektronik Centralen, Siemens, Thomson Sintra, and SGS-Thomson.

In information processing, Philips is leading a TIP dubbed Tropics. The aim is to develop an intelligent computer system capable of processing 1 billion instructions per second and including 50 to 300 parallel processors. Possible applications are automated translations and "number-crunching" expert systems. The project partners are CAP Sogeti, Olivetti, Nixdorf, and Thomson-CSF.

Another application-oriented project concerns "Home Systems," an extension of a EUREKA project. It concerns the standardization of an integrated electronic system for homes and offices, including security and (tele)communications systems.

A TIP on "Bipolar Silicon ICs with Very High Switching Speeds" brings together Siemens as the project leader and Philips, Telefunken, and SGS-Thomson as partners.

Under Olivetti's leadership, a project is being conducted on a European high-capacity workstation which can be used for either voice, data, and text, or images.

DENMARK/GREENLAND

First Digital Switching Station in Greenland in Operation

55002434 Godthaab GRONLANDSPOSTEN in Danish
7 Dec 88 p 12

[Article by Kaja Morup: "New Telephone Switching Station"]

[Excerpts] Ilulissat was the first city to receive an advanced digital telephone switching station. The next cities will be Nuuk and Maniitsoq.

Greenland's telephone system has opened a new digital telephone switching station in Ilulissat. The station is the first of its kind in Greenland and has cost about 10 million kroner.

The old station, which is a country station made to serve smaller Danish cities, could no longer handle the heavy telephone traffic from the city's 1,300 users. The relays cracked and almost went into an uncontrolled circuit during periods of heavy use, Mondays and Fridays, to the great irritation of the users. The new digital station works dependably and silently and with it the problems for the inner city telephone traffic are solved, a fact that the users have already been able to detect.

In the Container Building

B&O made the new station, and telephone technicians from Greenland went to a 4-week course at B&O to learn the new technology.

Telephone Area Chief Jorgen Gant from Aasiaat, and Senior Telephone Supervisor Soren W. Sorensen from Copenhagen oriented an invited group of politicians and large users on the new station with a tour in the provisional container building.

It has been a complicated job getting the station to function, because the radio hook-up has not been digitalized, and there will not be money for this in the foreseeable future.

Rapid Development

Nuuk is the next city that will be partially served by a corresponding station, and then Maniitsoq.

The rapid development can be seen in the fact that in 1972 there were 147 users in Ilulissat, compared with 1,300 today. In the year 2000, a figure of 2,000 is expected, but this will not be a problem, because the station has planned for the future and can handle much more than today's requirement.

Jorgen Gant said that one problem for the telephone system in Greenland is keeping up with the huge growth in the need for telephone use. This means that there is

less optimism for the development in the rest of Greenland, and this in turn means that there will be the continual possibility of problems in calling stations outside of Ilulissat. [Passage omitted]

FEDERAL REPUBLIC OF GERMANY

Siemens, IBM Plan Electronics Partnership
36200090a Hamburg DER SPIEGEL in German
19 Dec 88 p 80

[Unattributed article: "Consider The Answer"; first paragraph is SPIEGEL introduction]

[Excerpt] Siemens and the computer giant IBM have joint plans—the competition fears an excessively powerful conglomerate on the market for modern telephone equipment.

Whenever Siemens chief Karlheinz Kaske mentions his corporation's plans, he likes to offer a powerful image: "As of now we will board any ship that passes by us."

Just before year's end, the Siemens team is ready for action once again. At a press conference in New York, IBM chief John Akers, head of the world's biggest computer corporation, joined with Kaske to present a new project, likely to change the world market for electronics. Akers said: "We are setting up a most important partnership. It is plus-plus."

"The double plus is strong indeed. Should the two super corporations achieve their goal, the competition—especially in Europe—will have a really hard time. The leading (by far) supplier of computers to industry and commerce, public agencies, and universities is securing the cooperation of an internationally leading telecommunications enterprise and thereby making it almost impossible for its competitors to catch up."

Siemens also benefits from the partnership. The billion [currency not specified] transaction is making the Munich firm the first telecommunications corporation with substantial market shares in Europe and the United States. Moreover, as a result of the sales cooperation agreed with IBM for the United States and Europe, Siemens will be able to sell its telephone systems much more easily.

The new partnership will run via the U.S. company, Rolm, largely unknown in Germany. That firm manufactures special computerized PBX equipment which operates telephone and data traffic in large and small companies and links them with the public telecommunications network.

In 1984, IBM bought the then prospering firm for \$1.5 billion and incorporated it in the IBM conglomerate. However, the special computers resulted in losses that lately ran at \$100-200 million per annum.

Siemens is now to take over Rolm's two U.S. factories (2,800 employees) and, together with IBM, establish a marketing network (5,500 personnel) for the sale of telecommunications products in the United States. In Europe, IBM will also sell a new telecommunications system for private business (Hicom), produced by Siemens. In future the two electronics giants also aim at closely cooperating in the development of new products for telephonic and data transmission.

The two corporations expect these agreements to yield new opportunities on a market that promises billions of business. Following telephone digitalization—sound waves are transmitted digitally—and the liberalization of postal transactions in Europe, data and telephone equipment will interact more and more closely. At the same time new services are constantly added, such as Btx, packet switch (bundled data transmission), mail box systems and the transmission of voices, data and images (ISDN0, also sent via telephone lines).

All these novelties have something in common: They combine traditional computer systems with telephone systems—two types of equipment that used to be strictly separated. The customary business partners of the postal services conduct their business mainly with central transmission systems and tend to lack understanding for the development of data technology. The classic data processors, on the other hand, have little knowledge of telephone equipment. Anyone capable of keeping up-to-date in both fields will recognize new trends at an early stage and manage to tackle the right products for the market.

Consequently IBM manager Akers stresses that IBM and Siemens will allow their customers to fully exploit the potential of telephone and data equipment. This is bound to result in benefits—"outstanding new products, comprehensive service and expanded use of the investments already made."

"Following the agreement with IBM, Siemens will be the biggest potential supplier with regard to PBX business. At the moment the Munich firm is still far from holding a strong market position. The situation is very different in Europe."

A few weeks before concluding its alliance with IBM, Siemens got together with the English telecommunications giant GEC (DM16 billion turnover). The two firms intend to buy up the English electronics firm Plessey (PBX installations, defense electronics) and divide it between them. The fraternal arrangements between Siemens, GEC and now IBM are hardly likely to benefit competition on the European electronics markets.

Siemens chief Kaske holds the ruthless competition on the world markets responsible for his corporation—long derided as the sleeping giant—to have become so active now. More cooperation agreements will follow with

respect to various other electronics markets. The competitors—France's Alcatel, Sweden's Ericsson, and the Netherlands' Philips—are left with only one alternative: Either they must live off the business in their domestic markets or join one of the established giants.

English Telecom consultant Jack Stockdale comments: "The big Europeans such as Alcatel should consider their response now. There is going to be a new elephant in the great world outside, an elephant who is supreme in both spheres—price and technology." [passage omitted]

Government, Industry Delaying Progress of Space Program

55002431a Munich *SUEDDEUTSCHE ZEITUNG*
in German 12 Dec 88 p 4

[Article by Rudolf Metzler: "European Space Flight with Reduced Thrust"]

[Text] It was not until the end of last week in the Bundestag that the government and the parties supporting it announced their willingness to stay with their objective of manned space flight in conjunction with the other Western European countries. This includes the development and construction of three future-oriented space programs. More than a year ago the countries that are joined together in the European space agency ESA announced agreement on bringing the following projects to fruition: the Ariane 5 booster rocket and the reusable space glider Hermes, both proposed by France and accompanied by appropriately loud propaganda, and the space laboratory Columbus as the European part of the international space station that is to be built jointly with the United States. Columbus is the FRG's contribution and is financed by it for the most part. Large technical projects of this magnitude need political support and should be aggressively defended by their proponents. But this is not the case.

In the Bundestag, Minister of Research and Technology Heinz Riesenhuber has defended the space package that was wrapped up in The Hague under his chairmanship, supported by the speakers of the coalition fractions, but it seemed to happen halfheartedly. One week earlier he had given the ministry's representatives in the pertinent ESA committee instructions to voice their opposition to the release of Hermes development money in the amount of almost DM1 billion and instead to approve this substantial amount in several smaller portions that depend on the progress of the work. However, Bonn was outvoted in the committee.

The largest amount ever in an ESA budget has still been approved for the development of Hermes components and the preceding technology programs. Almost one-third of this amount moreover will flow back into the

FRG. That happens according to the country's participation in the program, which has been dropped from 30 percent to 27.8 percent, because the great interest on the part of other ESA countries has led to an oversubscription of the program.

Representatives of ESA countries in Paris are now talking about the Germans' role as brakeman, which, they say, could be observed taking effect not only on the government, but also in the industry involved. In the correct perception that participation by too many companies means frictional losses, it has been decided to establish a common company. The German Hermes Company Ltd., with MBB having a 39 percent share, Dornier 28 percent and MAN, ANT, and AEG 11 percent each, is to be registered at the beginning of the new year, it will be located in Oberpfaffhausen near Munich and have a manager provided by Dornier.

When the new company, which will be a working partner of the two French companies with lead responsibility, Aerospatiale and Dassault, starts its work at the beginning of 1989, it is expected that cooperation with the Hermes builders in Toulouse will be smoother. The German companies have set up work teams in France and taken over positions of responsibility in the development departments. For some important systems, such as the heat protective tiles, life support and energy supply systems using onboard fuel cells, they have assumed the leading technical role. But the French, as those responsible for the concepts behind the entire Ariane 5 and Hermes system, are establishing the most important parameters.

The Hermes project has certainly been slowed by the uncertainty in the German aerospace industry about Daimler's acquisition of MBB and the effect of the subsequent formation of a joint company, Deutsche Aerospace, on the two companies which were formerly competitors. The delay in forming the German Agency for Space Flight (DARA) is not conducive to cooperation. If these obstacles can be removed in the new year, European space flight can once again expect more thrust.

Use of Astra TV Satellite Restricted

55002437 Stuttgart *VDI NACHRICHTEN* in German
9 Dec 88 p 13

[Article by Michael Peter: "Luxembourg's Astra Satellite Competes With TV-Sat: German Program Suppliers Give the Cold Shoulder to the Hot Bird: The Skies Above Europe Are Full of Satellites"; first paragraph is introduction]

[Text] On the night of 9 December, the European Astra television satellite, also called "hot bird," will be launched into orbit. However, despite extensive publicity in an effort to create a Europe-wide, attractive offering of programs, no German suppliers have yet emerged.

Blackout. No amount of rattling and shaking could help. Today, TV-Sat 1 continues to spin through space with its solar paddle clamped down tightly. "Fortunately we have two strings to our bow," joked Minister for Post & Telecommunications Christian Schwarz-Schilling after the DM-300-million disgrace, since cable partly makes up for the breakdown. TV screens are not blank; there is a multitude of images, thanks to cable connections. Schwarz-Schilling appeared calm when TV-Sat 1 had to be written off as space junk. The minister will be making another attempt this summer, with the successor, TV-Sat 2. Still, the minister cannot quietly lean back in his chair, because the private-sector competition is not resting.

The night of 9 December, Luxembourg's Societe Europeenne des Satellites (SES) will be launching its first satellite into space. Astra will be able to beam 16 television programs directly into Europe's living rooms, and anyone with a parabolic antenna with a diameter of 60-90 cm in their yard or on their roof will be able to receive them.

So much for anticipation, since the bright prospects offered by the Luxembourg company need a little more time before they become reality. Of the 16 channels, only 9 have been sold, at an annual rate of DM10 million each, and these are probably the ones least likely to captivate German viewers.

Based on the slogan "whoever provides a lot will earn a lot," the SES has put together a colorful offering of programs. Lifestyle deals with women's topics. Sky News is a news channel, and Sky Movies and Disney Channel naturally offer a great deal of entertainment. The highlights certainly include the two sports programs, Screen-sport and Eurosport, which are also broadcast in German. However, SES is not at all sure how many dyed-in-the-wool television viewers will want to brush up on their knowledge of foreign languages through the Astra programs.

Media Treaty Limits Involvement

This points to a sore point: Thus far, all German program suppliers have given the cold shoulder to the "hot bird," as SES proudly calls its Astra. However, the Luxembourg company is remaining "very confident," and is continuing negotiations—with Eureka, Tele 5, Sat 1 and RTL Plus. "Once Astra is at the top," SES believes, "the Germans will come dragging along." However, the situation is not quite that simple. And this has to do with the media treaty negotiated not by the German Bundespost, but rather by the minister presidents of the Bundeslaender.

According to this agreement, the program suppliers receive the coveted ground frequencies—the broadcasts can be received with a standard television set and a basic antenna—that are also registered to a channel on TV-Sat. "Unfair competition," complained several participants at an SES symposium in Bonn in early November.

Bundestag delegate and CDU media spokesman Dieter Weirich went one step further. The Social Democrats, he said, were even obstructing the programming freedom of private television companies here. If Sat 1 and RTL Plus had not included the "Spiegel" news magazine and Alexander Kluge's "Kulturmagazin" in their offerings, they would not have been granted the ground frequencies in North Rhine-Westphalia.

But back to the SES concerns. The company is dependent on German programs, since German-speaking Europe is its largest potential market. "It is possible that by the turn of the century 7.7 million households will receive new programs neither via cable nor by ground broadcast," figures SES general manager Pierre Meyrat. And he adds that Germans spend the most money in Europe on leisure, and are thus occupy the ideal target and advertising area for programs via Astra.

Naturally, Germans are also this for the other satellites suspended in Europe's skies. For example, the postal service is involved in both Eutelsat, with 10 programs ranging from RTL Plus to Teleclub to the Italian Rai Uno, and the complementary Intelsat. And that is not the end of the Bundespost's involvement. Before TV-Sat 2, in March or April 1989, there will be the launch of Kopernikus, which will provide up to 13 television channels. There will be an oversupply no later than in the 1990's. Still, even today the viewer hardly knows which satellite to choose, since for each one he needs a new antenna and different peripheral equipment.

SES now believes that it can bring this variety of offerings under control and win viewers over at a very low additional cost. The new Astra television age is supposed to begin with DM1,000 for the 60-cm "salad dish," with a low-noise converter and tuner. The West German antenna manufacturers have lined up behind the Luxembourg company, and are anticipating brisk business. Technisat hopes to sell between 250,000 and 500,000 systems in the coming year alone.

More difficult and expensive is reception via Eutelsat and Intelsat. The parabolic antennas must be corresponding larger for these low-power satellites. But even with Astra, a decoder is needed for Scandinavian programs, in order to translate the D-2-Mac signals into the standard PAL norm.

Only television viewers who are connected to cable are spared from the agony of choosing. They indirectly receive programs from the "postal satellite" anyway, and SES has announced that it will market its programs via cable as well. However, an entire generation of television viewers will have to acquire new equipment within a few years. For example, once high-density television (HDTV) with HD-Mac becomes standard, the days of the converter will finally be over.

PAS-1 To Bring Competition to Communications Market

55002431b Frankfurt/Main FRANKFURTER

ALLGEMEINE in German 21 Dec 88 p 8

[Article by Anatol Johansen: "PAS-1 Brings a Shot of Competition"]

[Text] On 15 June this year a satellite was launched in Kourou in French Guyana which should inject a shot of competition into the previously closed market of transoceanic satellite transmission. For more than 2 decades the international satellite organization Intelsat, one of whose more than 100 member-nations is the FRG, has had a monopoly in transmissions from continent to continent.

But now the Pan American Satellite of the Alpha Lyracom Communications company, after tedious and very difficult negotiations, has received permission from the U.S. Federal Communications Commission (FCC) to transmit data, video conferences and television programs between North and South America as well as between the United States and Europe. Intelsat, which receives about 80 percent of its earnings from telephone transmissions, continues to reserve telephone traffic for itself. The new satellite is not permitted to participate in this lucrative business. In other respects too, Intelsat, with its more than 3 dozen satellites, has little cause to fear it. The president of Alpha Lyracom, which operates the Pan American Satellite (PAS-1) said at an information meeting in Cologne that even in the event that the transmission capacity of the new satellite (24 transponders in the C and Qu bands) were to be fully booked, this would not amount to even 1 percent of the transmission capacity made available by Intelsat. The president emphasized that the PAS-1—unlike TV Sat, TDF or Astra—was not suitable for beaming down TV programs to house antennas, but was better for point-to-point transmissions. It could be used by organizations, by companies with branches on this side and the other side of the Atlantic, by radio and TV stations, and for feeding American programs into European cable networks.

Negotiations, which have been held not only with the Bundespost but also with Luxembourg, England, Italy, and Sweden, showed that there is a definite interest in comparatively inexpensive data, video and TV transmissions. The first broadcasts to Spain started in December 1988. One of the things Alpha Lyracom is trying to do in the FRG is to set up business with the Bundespost.

At the PAS presentation in Cologne permanent secretary Klaus Hummel from the Postal Ministry referred to the Bundespost's monopoly. The Telecommunications Facilities Law states that the post office has the monopoly for the entire network. This included satellites as well as transmitting and receiving antennas. One could, Hummel said, rent receiving antennas from the post office at prices between DM300 and DM2,000 per month, depending on the size of these parabolic antennas and their equipment. Even the considerably larger

transmitting antennas could be rented from the post office for prices between DM50,000 and DM500,000 per year. Alpha Lyracom is now hoping that the post office will be willing to negotiate and will leave the setting up not only of receiving antennas but also of transmitting antennas to the operators and users of the Pan American Satellite. This is the only way in which the first private company in the history of space travel, which operates an intercontinental information satellite outside the Intelsat consortium, can act as a kind of price breaker on behalf of its customers.

No one can say whether this expectation will be fulfilled. Some interested parties—RTL-plus and others—have contacted the German representative of Alpha Lyracom (Scientific Consulting, Dr Schulte Hillen, Cologne) to implement commercial pilot projects using PAS-1 with individual permits from the Bundespost. It will then be seen whether the "icy breath of the postal monopoly," which was mentioned on the occasion of the PAS-1 presentation in Cologne, is still blowing afterwards. The Bundespost speaker, Klaus Hummel, remained tight-lipped about this question. He said that there could not be any discussion about passing on possible cost advantages to customers by bringing in the PAS satellite. So far Alpha Lyracom had offered the transmission capacity of PAS-1 only without final prices. In Cologne Hummel said that when a final offer was made, they could talk about prices. A decision about exact numbers would probably be made during December.

However the negotiations end, one thing is clear: PAS-1 is setting a new mark in satellite communication. It will mean the beginning of the end of the rigid price structure policy in intercontinental satellite communication. It does not take a great deal of courage to predict that the same thing will happen with satellite equipment as happened in air travel after the lifting of fixed IATA fares: prices will fall, competition will pick up, and the customer will profit.

FINLAND

Government, Local Phone Companies Join Packet Networks

55002424 Helsinki HELSINGIN SANOMAT in Finnish
2 Dec 88 p 40

[Text] The Postal and Telecommunications Agency (PTL) and privately owned telephone companies are currently finalizing agreements that would join together the competing packet networks, Digipak and Datapak.

PTL and the largest private telephone company, Helsinki Telephone Co. (HPY), agreed in October to join their packet networks, which are used for transferring data among computers.

The reason agreements between PTL and the local telephone companies have still not been finalized is that the parties have been waiting for guidelines from the Communications Ministry on replacing the net groups with so-called high-traffic areas.

The Finnish telephone network is divided into 10 net groups, which are to be replaced with 12 high-traffic areas.

PTL and the local telephone companies are combining their packet nets on the orders of Communications Minister Pekka Vannamo (Rural People's Party). Vannamo in May sent a threat to both parties: If they did not reach an understanding on combining their nets, he would take action on his own. Until now, the packet nets have competed with each other. In the future, PTL will handle long-distance traffic, and the local telephone companies will take care of only the traffic in their own areas.

NORWAY

Company Testing New Video Phone

55002429b Oslo AFTENPOSTEN in Norwegian
13 Dec 88 p 5

[Article by Cato Guhnfeldt: "Video Telephone in Use in Kjeller"]

[Excerpt] Several countries in Europe are now experimenting with video telephones—and Norway, one of the pioneering countries in this area—is not an exception. On 7 December the research division of the Telecommunications Directorate in Kjeller received the eight new video phones that will be tested for at least 1 year.

"The video phone is just about fully developed," [Researcher Ole] Melteig said. "This model is mainly for internal use within companies. All the signals are transmitted digitally by light signals through fiber optics. For this reason, it is not a device that can now be hooked up to the public telecommunications network, even though the Telecommunications Service has been installing fiber optic cables in this country for many years now. On the other hand, the picture quality is high, thanks to broadband video technology. A video telephone of this type could perhaps be used by deaf people and in business, to show drawings and such during a conversation," he said.

The STK picture telephone consists of an ordinary PC screen with a camera right under the screen. In the present tests, the telephone is also used to establish initial contact. In the future, however, there is no reason not to place the functions of the telephone in the computer keyboard.

This is a combination of a computer and a video telephone, according to Melteig. "It will be used, for example, to present texts and drawings on part of the

screen. The picture is controlled by an in-house telephone exchange that STK has been producing for many years. Companies that already have this exchange need only screens with a camera, new software, and fiber optic cables in order to set up internal communications. STK has transmitted signals without amplification through fiber optic cables over distances up to 10 km," Melteig said.

STK has developed the video phone over the past 4 years at a cost of about 15 million kroner. A unit now costs about 90,000 kroner, including a small computer that is needed. The eight units are industrial prototypes, however, and they will be tested to create new ideas for further development of the product. In the future, the video telephone could be particularly important in areas such as teleteaching and telemedicine, the researchers believe.

A model for private use that can be connected to today's public telecommunications network has also been developed by Tandberg Telecom, in cooperation with the Telecommunications Directorate. It is not yet ready for marketing, but it is estimated that it can be introduced in Norway in 1993.

"With a further developed model of the video telephone we are now testing, it will also be possible for a person to speak with several other customers and perhaps hold conferences," Melteig said. "There is a major effort currently under way to introduce this type of service in Europe. And Norway is in a good position to do this," he said.

ISDN Network First Project for New Testing Center

55002429c Oslo AFTENPOSTEN in Norwegian
7 Dec 88 p 3

[Article by Ulf Peter Hellstrom: "Future Telecommunications Network Now Being Tested"]

[Text] The telecommunications network of the future is now being tested in Oslo at the Telecommunications Service's center for testing new services that will be offered to subscribers after the telecommunications network is modernized. Several manufacturers are involved in the pilot project.

Speech, text, data, and eventually pictures will be transmitted over the future ISDN (Integrated Services Digital Network) that the Telecommunications Service will construct during the 1990's. The agency has begun an internal project to test new equipment, lines, and services. Beginning in 1990, the new services will begin in a 2-year trial phase.

At that time, the ISDN services will be offered to customers in the major cities of Oslo, Stavanger, Bergen, and Trondheim. Only a limited number of customers will be offered the new services in 1990. Among other

things, these services will make it possible to transmit both speech and data through the same cable and from the same equipment. Beginning in 1992, according to plans, the ISDN services will be offered to Telecommunications Service customers as ordinary telephone options, as previously advertised by the Telecommunications Service.

Firms now participating in the pilot project at Okern in Oslo are Alcatel STK, EB Ericsson, EB Telecom (owned by Asea Brown & Boveri), IBM, Bosch-Telenorma, and Siemens of Norway. Several other companies also want to participate in the testing.

Telecommunications Agency Chief on Expansion Plans

55002429a Oslo AFTENPOSTEN in Norwegian
21 Dec 88 p 14

[Article by Ulf Peter Hellstrom: "Holler Promises Cheaper Telephones"]

[Text] Telephones will be less expensive during the coming year. In particular, rates for calls abroad are still too high, general director Kjell Holler said yesterday. Availability on the Norwegian telecommunications network has improved somewhat.

"The Telecommunications Service intends to reduce fees for its services by 4 percent annually during the coming years, compared to the price trend in society as a whole," said general director Holler at the Telecommunications Service's annual press conference on Tuesday in Oslo. Since 1984 telecommunications fees have dropped by 23 percent compared to the consumer price index.

"By European standards, we are somewhere in the middle," Holler said. France, Great Britain, and Austria are more expensive than Norway, while fees are still considerably lower in Sweden.

1.03 Kroner Per Message Registration

The price per message registration for a domestic telephone call will increase to 1.03 kroner at the beginning of next year. If telephone fees had followed other price rises since 1984, a message registration would have cost about 1.30 kroner today.

Long distance calls, especially calls abroad, will be relatively less expensive. "The Telecommunications Service is facing a difficult process here, now that long distance rates must be reduced relative to local calls, at least if other customer fees are increased at the same time. We, too, must prepare ourselves for conditions in the EC," Holler said.

Better Availability

Over the years, the Telecommunications Service has received many complaints over availability on the telecommunications network especially in Oslo and other large cities at certain times of day. But now the Telecommunications Service promises that it is becoming easier to get through on the heavily strained telecommunications network. During September, availability on a nationwide basis was 95.6 percent. Availability is now about 2 percent higher than last fall.

12 Days for New Phone

The installation time for a new telephone has now dropped to 12 days, according to the general director. The latest statistics show that it took just 9.7 days to have one's phone service changed to a new address.

The number of telephone subscribers has now reached almost 2 million, although the increase in 1988 seems to be lower than in recent years. The number of telephones per capita in Norway is now higher than in West Germany, Belgium, and the Netherlands, but we are still behind Denmark and, especially, Sweden.

Slower Growth For Telecommunications Service

Telephone traffic and the number of new subscribers are both lower than in the past. Nevertheless, the self-financed Telecommunications Service is still expecting record profits of 1.5 billion kroner next year.

The Telecommunications Service estimates that its volume will increase by 8 or 9 percent this year, according to general director Kjell Holler. The agency estimates that it will clear 1.25 billion kroner this year, out of a gross income of 13.7 billion. According to the budget, operating receipts should reach 14.6 billion next year, with profits of 1.5 billion. If these predictions are true, then the monopoly Telecommunications Service will earn higher profits than the non-monopoly companies that are listed on the stock exchange, with the exception of Norsk Hydro.

The agency hopes to avoid layoffs in the future and believes that any future reductions will occur by way of natural attrition and a hiring freeze in large sections of the organization. Preliminary estimates indicate that the number of employees will drop by about 200 this year to about 16,900 so-called whole-year workers. This does not include the non-monopoly subsidiary TBK. TBK misjudged developments on the market, according to Holler.

The Telecommunications Service is now able to finance its annual investments of an estimated 5 billion kroner with its own funds.

SWEDEN

Ericsson Meeting Renewed Success in World Sales

55002428a Stockholm DAGENS NYHETER in Swedish
30 Nov 88 p 16

[Article by Torun Nilsson: "Ericsson Increases New Orders"]

[Text] Ericsson has advanced in the world telecommunications market this year, but the Swedes are still too small. In order to compete seriously in the league of the six major players who dominate the market, Ericsson must increase its share. The next few years will decide the outcome in several important markets: Italy, the United States, West Germany, and Eastern Europe.

Suddenly, Ericsson is doing much better than expected in the telecommunications markets of the world. During the first 9 months of the year, orders in its public telecommunications division (which mainly produces AXE exchanges and equipment for them) increased by 46 percent. This strong increase was unexpected.

World telecommunications markets have developed rather slowly in recent years. It has even been claimed that they have matured, that is to say that they would not become much larger than they are.

"The sharp rise in new orders came about both because demand has increased more than expected and because Ericsson has won new market shares, especially in Great Britain, Spain, the Netherlands, and Italy," marketing director Bo Landin said.

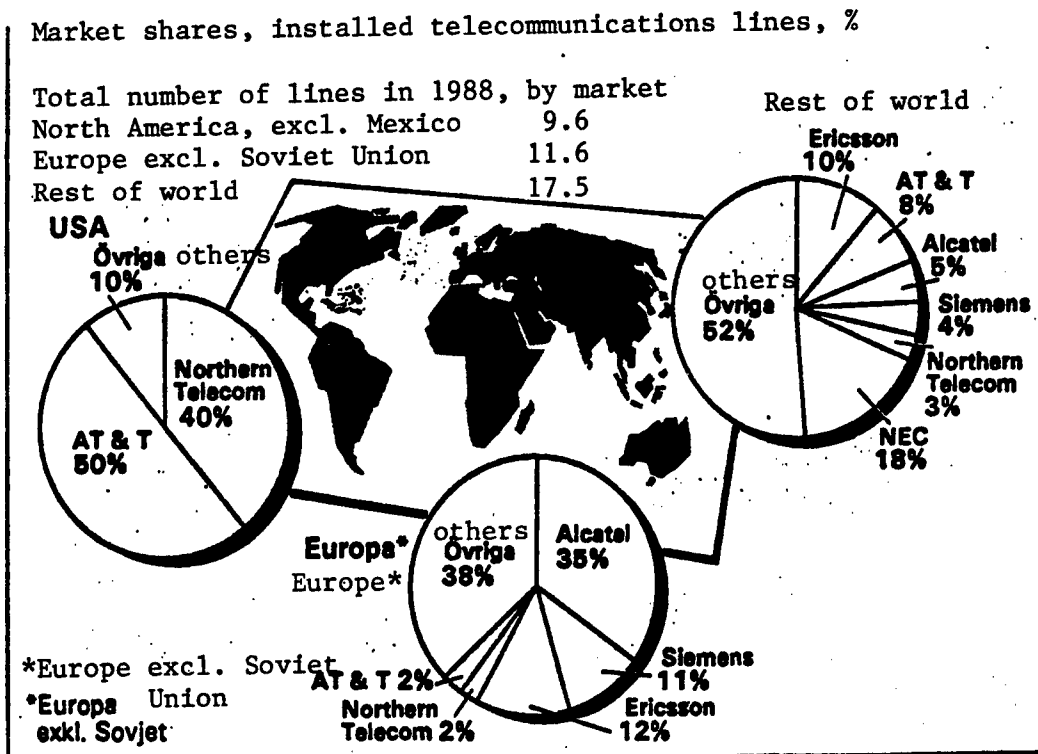
Welcome

The upturn is welcome at Ericsson, which has had serious profitability problems in recent years, primarily because of an unsuccessful venture into computers during the early 1980's. After a thorough house-cleaning, which meant among other things that Ericsson has concentrated more and more on the AXE and the rapidly growing mobile telephone market, profits are on the way up. This year Ericsson expects to clear about 1.7 billion kronor. Total sales will be about 30 billion kronor.

But Ericsson's profits are still about 1 billion kronor too low for the company to be sufficiently profitable. One problem is that, despite the encouraging number of new orders this year, the company is still too small to compete in the long term in the telecommunications markets of the world. It requires a certain volume to bear the cost of further developing a telecommunications system (such as Ericsson's AXE system).

Hard Battle

Today Ericsson holds about 9 percent of the world market in telephone exchanges. Management's goal is to increase its share to 13 percent by 1991 or 1992.



But the battle for world markets is hard. In recent years, it has become clear that only about six of the 15 large suppliers in the world would survive on their own, namely the American company AT&T, Northern Telecom of Canada, West German Siemens, Alcatel of France, the Japanese firm NEC, and Ericsson.

If Siemens succeeds in its attempt, along with GEC, to take over the joint British telecommunications activities of Plessey and GEC, then the last piece of the puzzle will be in place.

This is the gang with which Ericsson must continually fight. Ericsson is one of the smaller members of this league. The outcome in several important markets will be decided in the next few years.

Decisive

In just the next few months we will probably know who will participate in the 4-year expansion of the Italian telecommunications network, which will cost a total of \$25 billion. Ericsson, Siemens, Alcatel, and AT&T are competing for the contract to work with Italtel, a sister corporation of the Italian telecommunications service. Who the final winner will be depends on which political considerations the Italians believe to be most important. Will they pass by an American company, a company from an EC country, or both by choosing Ericsson? For AT&T, landing this contract would mean an important breakthrough on the European market.

Ericsson is attempting to downplay the importance of this contract.

"It would be just as interesting to remain a subcontractor on the Italian market," Bo Landin said.

In the United States, the battle continues to see who will be the third and fourth suppliers behind the local firm AT&T and the Canadian company Northern Telecom. Here Ericsson is battling Siemens and NEC.

United States in Lead

The American market is important. The United States is in the lead when it comes to developing new telecommunications services, an ability that is becoming more and more important as the telecommunications monopolies of the world are deregulated and there is a greater demand for various new features.

One such feature is the so-called 020 service where the receiver pays for the call. Many companies make use of this when they want to offer customers toll-free calls for information or to place orders.

So far, Ericsson is not doing too well in the United States. The goal of a 5- to 8-percent market share has been postponed repeatedly, which troubles outside observers. So far, the Swedes have received orders for only 150 to 200 thousand lines, compared to the figure of 700,000 that is needed.

In 1990 the telecommunications monopoly on the large West German market will end. The Swedes seem to be in a weak position here, since Ericsson hardly has any activities in West Germany today.

Eastern Europe

Finally, the last large unexplored region on the map for all the major telecommunications suppliers is Eastern Europe.

"Interest in Eastern Europe has increased sharply in recent years," said Carl-Henrik Strom, an expert on the Eastern Countries for Ericsson's marketing staff.

So far, Northern Telecom seems to have made the most progress, with an order worth about 0.5 billion from Hungary. Ericsson has also had an order from Hungary, but it is much smaller at about 50 million kronor.

"Sales to the Eastern countries are difficult because of limitations on the re-export of American components and technology. To be sure, the requirements are becoming less strict, but every order will still have to be approved," Carl-Henrik Strom said.

According to both him and Bo Landin, however, the main difficulty is financing.

"To be sure, the Eastern countries have great needs, but they also have a large number of areas in which to spend their money," Carl-Henrik Strom said.

System Development

The uncertainty over who will win in these markets means that the league of six big-time players could well change in the future. Those who end up in last place may be forced to work with other companies. Ericsson is one of the ones in danger of doing this if the company does not gain additional shares of the market. They must not only have money for further developing existing systems, but they must also develop the next generation.

Telecommunications Network Undergoing Major Expansion

55002428b Stockholm DAGENS NYHETER in Swedish
22 Nov 88 p 37

[Article by Pralen Melander: "Telecommunications Service Spending Billions To Expand"]

[Text] Telecommunications traffic is developing literally at lightning speed toward goals that, just 10 years ago, would have been considered pure science fiction.

In Stockholm, the Telecommunications Service is expanding at a rate of 1 billion kronor per year. The largest item in this expansion is modernization of telephone exchanges and lines.

"Of this billion, about 500 million kronor is spent on new exchanges. New lines account for 250 million and auxiliary facilities, such as buildings, for 250 million," said Carl Goran Larsson, chief of the Stockholm telecommunications region.

Pressure Increasing

The Telecommunications Service is expanding to accommodate normal peak traffic. Pressure on the telecommunications cables is increasing every day. More and more people are trying to get through with their communications. Today, it is not simply a matter of sound in the form of chatting on the phone. Text, data, and picture communications are the other major items. Data communications have developed particularly rapidly.

Telephone traffic has increased most rapidly in the area of telephone calls abroad. They are increasing at a rate of 15 percent per year. The Stockholm region alone accounts for 330 million call-minutes abroad per year.

There were 5.642 million call-minutes to Finland in October. West Germany and Norway accounted for 2.877 million and 2.805 million minutes, respectively. Then came Great Britain with 2.666 million, and Denmark with 1.662 million call-minutes.

AXE Exchanges

More and more of today's society is "computerized," which places great demands on the reliability of the telecommunications network. For this reason, new AXE exchanges are gradually being put into operation. Experience has shown that they increase reliability and availability from about 95 percent to 98 or 99 percent.

"Of course, 100 percent is the ideal figure, but it is a practically unachievable goal," Carl Goran Larsson said. "We must always consider external factors. For example, every year cables are cut, costing 35 million kronor in repairs. The losses to society caused by cut cables are many times this figure."

The first step in reducing the risk of interruptions is laying protected cables, such as in tunnels. The power supply is being complemented by emergency power plants. In addition, the Telecommunications Service must know exactly where its cable are, which requires good computerized documentation.

Bank Traffic

One example of increased computerization is traffic by banks to and from centralized computers. Every day millions of transactions at bank windows and behind bank counters flow in and out of centralized computer memories over the telecommunications network.

The spread of AXE stations is indicated by the map above. The ordinary customer gains more than a quick dial tone in his ear.

He can also order a number of services, such as wake-up calls, call forwarding, automatic redial, and call waiting.

"Call forwarding has become a much-used service," said Kjell Palmqvist, information chief at the Telecommunications Service. "During an initial phase, we charged for call forwarding. Today we charge only for the call."

As an example, a person who orders call forwarding from his home telephone in Stockholm to his summer cottage in Jamtland pays the ordinary rate for a call from Stockholm to Jamtland.

Personal Services

The people behind all the technology never disappear, however, although the percentage of their traffic is dropping steadily. Of the 8,500 employees in the Stockholm telecommunications region, 1,300 work in personal services.

"On the contrary, the new technology that is offered often needs to be complemented by the 'human factor,'" said Dag Hjorth of the Telecommunications Service. "Directory assistance is perhaps the best example. When they need phone numbers in other countries, we use that country's telephone books or call their directory assistance."

There is an impressive amount of linguistic ability at the foreign service department.

"The Telecommunications Service can provide interpreters for 64 languages," Hjorth said. "If it is some exotic language, then the customer should order an interpreter several days in advance."

Many telecommunications services are simply hired out. A mail order firm that normally records orders on tape may want special service after an ad campaign. The company can then hire an employee of the Telecommunications Service to answer the phone and take orders personally.

TV Shopping

In the not too distant future, the marketing of products may be combined with TV shopping.

"There is a strong trend in this direction in the United States and, after all, we usually follow American trends," said Kjell-Ove Blom, who does future planning in the Stockholm telecommunications region.

Soon we will be able to sit at home and pay bills, look at train schedules, look up telephone numbers, or order food from the local grocery.

"Just as we have become accustomed to having one or more electrical outlets in each room at home, in the future we will have a number of telephone jacks for using a variety of computer and telecommunications services," Blom predicted.

It is believed that in the late nineties we will have access to a so-called universal terminal at home. It will have a personal computer, FAX for text transmission, telephone, and TV.

We will be able to see the telephones and TV sets of yesterday and today in the Telecommunications Museum on the bottom floor of the Museum of Technology, which even today makes for an interesting excursion.

AXE Switching Stations for Rural Phone Nets
55002428c Stockholm DAGENS NYHETER in Swedish
14 Dec 88 p 12

[Article: "Rural Areas Get Better Phone Service"]

[Text] Beginning next year the rural population of Sweden will receive better telephone service. At that time, the Telecommunications Service will begin installing a smaller version of the AXE exchange at smaller telephone exchanges. They will provide the same services as those found in big cities.

This was stated by general director of the Telecommunications Service Tony Hagstrom in an interview with the Social Democratic morning newspapers.

This service means that customers can receive help leaving messages, receive automatic wake-up calls, put callers on hold, and receive help with redialing.

UNITED KINGDOM

Satellite Adds 16 Channels to Television in Britain
55500036 London THE DAILY TELEGRAPH
in English 12 Dec 88 p 4

[Article by Jane Thynne and Air Cdre G.S. Cooper]

[Text] The Ariane-4 rocket carrying the Astra 1A direct broadcast satellite which will bring 16 television channels to Britain, was launched at 1 am yesterday from Kourou, French Guiana, after a 24-hour delay.

The rocket, on its first commercial flight, also carried Skynet 4, the first of three satellites built by British Aerospace and GEC-Marconi in a military communications programme that has cost L360 million.

An electrical storm, problems at the Nasa tracking station in Ascension Island and a faulty sensor prevented the launch on Friday night. A second attempt at midnight was foiled by a leaking engine valve.

The L400 million Astra venture is backed by the Luxembourg Government and European banks. Three British ITV companies, Thames, TSW and Ulster, also have stakes.

Although Astra's services officially start on 1 February, it is not clear how many receiving dishes will be available, although the estimate is 200,000. Mr Alan Sugar's Amstrad has said it expects to market 1 million next year, and 80 other firms will be producing equipment estimated to range from L199 to L399.

Six of the Astra satellite channels will be owned by Mr Rupert Murdoch. Three will be supported by advertising and will show entertainment, news and sport. Film and Disney channels will be available for a £12 a month subscription and there will also be an arts and classic film subscription channel.

Initially, all channels will be broadcast free, but from September some signals will be available only to subscribers.

There will be two channels from W.H. Smith, a women's and a sports channel, two Scandinavian-owned channels and one expected to be owned by Mr Robert Maxwell.

Skynet 4, when on station over the Gulf of Guinea, will provide Britain's forces with a secure radio relay in space. Skynet 4 was designed to be launched from the American space shuttle, which would also have carried a British payload specialist in the crew.

The delay caused by the Challenger disaster in January 1986 meant the satellite had to be modified to use Ariane. The second Skynet 4 is due to be launched next August and the third in May 1990.

A satellite control centre is being built by British Aerospace at RAF Oakington, near Bordon, Hampshire. Skynet is expected to work for seven years and survive electronic warfare.

British Aerospace and Marconi Space Systems won a contract last year to supply Nato with communications satellites, the first contract awarded to a non-American supplier.

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